University of Alberta

Taking care of bison: Community perceptions of the Hook Lake Wood Bison Recovery Project in Fort Resolution, NT, Canada

by

Janna Christine van Kessel

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

in

Wildlife Ecology and Management

Department of Renewable Resources

Edmonton, Alberta

Fall 2002

National Library of Canada
Acquisitions and Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale du Canada
Acquisitions et services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-81493-9

Canada

University of Alberta

Library Release Form

Name of Author: Janna Christine van Kessel

Title of Thesis: Taking care of bison: Community perceptions of the Hook Lake Wood Bison Recovery Project in Fort Resolution, NT, Canada.

Degree: Master of Science

Year this Degree Granted: 2002

Permission is hereby granted to the University of Alberta Library to reproduce single copies of this thesis and lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves all other publication and other rights in association with the copyright in the thesis, and except as herein before provided, neither the thesis nor any substantial portion thereof may be printed or otherwise reproduced in any material form whatever without the author's prior written permission.

Janna van Kessel

June 27, 2002

Box 1667 Blairmore, AB
Canada T0K 0E0

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled, "Taking care of bison: community perceptions of the Hook Lake Wood Bison Recovery Project in Fort Resolution, NT, Canada" submitted by Janna Christine van Kessel in partial fulfillment of the requirements for the degree of Master of Science in Wildlife Ecology and Management.

Dr. Robert J. Hudson
(Co-supervisor)

Dr. Naomi T. Krogman
(Co-supervisor)

Prof. Theresa A. Ferguson

June 26, 2002.

Dr. C. Cormack Gates

Abstract

This study describes Native community perceptions of the Hook Lake Wood Bison Recovery Project and options for its future management. In 1999, I conducted thirty in-depth, semi-structured interviews with residents in the community of Fort Resolution, NT including participant and non-participant observations. Resident perceptions about the recovery project and priorities for the future care of the bison appeared to be strongly influenced by their knowledge of the project, their views on proper relationships between humans and nature, and beliefs about the aetiology of disease in bison. Dissemination of knowledge from managers to residents is complicated by challenges of communication between project staff and residents as well as community trust and acceptance of the project and mangers. Clearly defined roles and responsibilities of co-management partners are needed to establish a sense of shared decision-making processes and of shared ownership of the recovery project by community members.

Dedication

For Mum, Dad, Cathryn, and Brad –
for your encouragement and for believing in me.

Acknowledgements

First of all, I would like to thank the community members of Fort Resolution for welcoming me into their community and for their acceptance of and participation in this research. I would also like to thank Dora Unka for her assistance with translations, Richard Simon and Lloyd Norn for acting as community liaisons, and to all of my new human and bison friends in the area. Marci cho.

My research would be incomplete without the guidance and support of my committee. Thank you Dr. Robert Hudson, Dr. Naomi Krogman, and Ms. Theresa Ferguson.
Naomi, I would especially like to thank you for keeping me on the right track and for your advice on qualitative inquiry.

I would also like to recognize the resource support that made this research possible. I am grateful to the Territorial Farmers Association and the Canadian Circumpolar Institute (Northern Scientific Training Program) for their financial support. I would like to thank the Department of Resources, Wildlife, and Economic Development, GNWT for their in-kind support of lodging (especially at 'the brown house'), nourishment, and reference papers. John Nishi, Troy Ellsworth, Brett Elkin, and Cormack Gates- thanks for the opportunity to work with great recovery project team members.

Diane, thank you for your help with my final transcriptions when my wrists were too sore to type.

For my family, thanks Mum and Dad for sending emergency supplies to the North, for answering all of my computer questions, and for your confidence in me. Cathryn, thanks for being my sister and my friend and for always being just a phone call away.

Brad, my love, husband, and best friend, thank you for your enduring support, your reality checks, and your love throughout this lengthy process...and for walking into Stan's Quick Stop that warm summer night.

Table of Contents

Chapter 1: Introduction 1
1.0 Introduction 1
1.1 Purpose and objectives of my study 2
1.2 Significance of the study 3
1.3 My role 3
1.4 Thesis organization 4

Chapter 2: Background to the study 5
2.0 Fort Resolution region 5
2.0.1 History of the people 7
2.0.2 Gender 12
2.0.3 Demographics 13
2.0.4 Community Governance 15
2.0.5 Local Economy 15
2.1 Wildlife hunting regulations 18
2.2 Wood Bison management controversy 20
2.2.1 The solutions? 23
2.3 Hook Lake Wood Bison Recovery Project 25
2.3.1 Goals and phases 27
2.3.2 Current status 30
2.3.3 Personnel structure and organization of the HLWBRP 31

Chapter 3: Theoretical Approach 35
3.0 Introduction 35
3.1 Co-management of resources 35
3.1.1 Co-management challenges 37
3.2 Indigenous knowledge 40
3.2.1 Indigenous knowledge, traditional ecological knowledge, science, and management 44
3.3 Aboriginal community perceptions 48
3.3.1 Spiritual and material significance of bison 49

3.3.2 Native perceptions of wildlife research and management 51
3.3.3 Native communities and wildlife commercialization 54
3.4 Conclusion 55

Chapter 4: Research Methods 56
4.0 Introduction 56
4.1 Review of Objectives 56
4.2 Description of research approach 57
4.3 Approval of research 59
4.3.1 Community acceptance 60
4.3.1.1 Community liaisons 60
4.3.2 Human ethics considerations 61
4.3.3 Researcher neutrality 62
4.4 Interview guide development 62
4.4.1 Pre-test in the field 63
4.5 Description of sample 64
4.5.1 Access to participants 65
4.6 Data collection in the field 66
4.6.1 Observation 67
4.6.2 Informed consent 69
4.6.3 In-depth interviews 70
4.6.4 Translation and transcription of interviews 71
4.7 Data analysis 73
4.8 Verifying initial results 75
4.8.1 Rigour of my study 76

Chapter 5: Study Results 79
5.0 Introduction 79
5.1 Knowledge of recovery project 79
5.2 Perceptions of the recovery project 82
5.2.1 Perceptions of the habitat enhancement phase 83
5.2.2 Relationship between humans and bison 84
5.2.3 Perceptions of Disease 87
5.2.3.1 Aetiology of disease 89

5.2.3.2 Treatment necessary for diseased bison? 91
5.3 Future of the recovery project 92
5.3.1 Perceived economic development options 94
5.4 Perceived relationships between managers of the recovery project and community members 95
5. 5 Communication 96

Chapter 6: Discussion and Conclusions 99
6.0 Introduction 99
6.1 Hook Lake Wood Bison Recovery Project and co-management, how well is the project working? 100
6.1.1 Context of the HLWBRP within the community 104
6.1.2 Community priorities for the recovery project and wild herds 112
6.2 Suggestions for improved communication between project managers and the community 114
6.3 Community acceptance & trust 117
6.4 Community participation 120
6.5 Meeting my objectives 122
6.6 Practical contributions of research 125
6.7 Recommendations for future research 126
6.8 Final thoughts 128

References 130
Appendix I: 146
Map of early Fort Resolution satellite communities 146
Appendix II: 148
Interview guide, information sheet for participants, consent form 148

List of Figures and Tables

Figures

Figure 1: Map of Fort Resolution and area 6
Figure 2: Management options presented to the panel 24
Figure 3: Goals of the Hook Lake Wood Bison Management Plan 27
Figure 4: Indigenous knowledge 42
Figure 5: Initial coding categories for data analysis 74

Tables

Table 1: Population of Fort Resolution by gender and age 14
Table 2: Current bison population at the Fred Dawson Facility 31
Table 3: 2000-01 Budget for the HLWBRP 32
Table 4: Characteristics of Indigenous Knowledge and Scientific Knowledge 44
Table 5: Comparison between scientific and ecosystem-based management 47
Table 6: Observation categories for interviews 71

List of Abbreviations

APFRAN	Animal, Plant and Food Risk Assessment Network
AWHC	Aboriginal Wildlife Harvesters Committee
BRCP	Bison Research and Containment Program
CFIA	Canadian Food Inspection Agency
DCC	Deninoo Community Council
DKFN	Deninu Kue' First Nation
DRR	Department of Renewable Resources
DWRC	Deninoo Wildlife and Resources Committee
EINP	Elk Island National Park
FEARO	Federal Environmental Assessment Review Office
GNWT	Government of the Northwest Territories
HBC	Hudson's Bay Company
HL	Hook Lake
HLWBRP	Hook Lake Wood Bison Recovery Project
IK	Indigenous Knowledge
MBS	Mackenzie Bison Sanctuary
NBMB	Northern Buffalo Management Board
NWC	North West Company
NWMP	North West Mounted Police
RAC	Research Advisory Committee
RCMP	Royal Canadian Mounted Police
RWED	Resources, Wildlife, and Economic Development (Department of the GNWT, formerly DRR)
SK	Scientific knowledge
SRL	Slave River Lowlands
TB	Tuberculosis
TEK	Traditional ecological knowledge
TFA	Territorial Farmers Association
TK	Traditional knowledge
WBNP	Wood Buffalo National Park

Chapter 1: Introduction

1.0 Introduction

The care of wood bison *(Bison bison athabascae)* in the Northwest Territories and Northern Alberta is important to many parties, especially wildlife managers and Native people. Government, scientific, and Aboriginal communities have different ideas about the management of this wildlife species, a debate that has lasted over one hundred years. Management of wood bison, in particular, the diseased populations, has remained an ongoing and contentious political, social, and biological issue for the past 80 years.

A variety of parties have a vested interest in wood bison recovery efforts. Native communities are primarily concerned with the effect of wood bison recovery on their traditional hunting practices. Health organizations including the Canadian Food Inspection Agency are concerned about the risk of disease to human health, to commercial cattle herds, and to disease-free herds of bison. Clean-up of infected, free ranging wood bison herds would contribute directly to the continued economic viability of the Alberta cattle and bison production industries (i.e., insurance and disease testing costs) and enhance the potential of a Northwest Territories cattle or bison industry. Bovine tuberculosis and brucellosis diseases present in the wild bison populations in the Wood Buffalo National Park and Slave River Lowlands areas are viewed by the cattle industry as a threat to cattle in northern grazing leases. Should northern diseased bison populations be eliminated in these areas, even briefly, environmental groups are concerned about the loss of genetic diversity and changes in the ecosystem function. Heritage groups are concerned about the loss of Wood Buffalo National Park as an UNESCO heritage site. Bison conservation organizations such as the Wood Bison Recovery Team are interested in the protection of wood bison and re-introduction of animals to their former habitat. Additional concerns include the survivability of diseased bison herds, maintenance of ecological function, recovery of wood bison genetics, and sustainability of Aboriginal hunting practices.

In 1991, the Hook Lake Wood Bison Recovery Project was initiated by Fort Resolution community members in response to the northern diseased bison issue. The recovery project addressed the 1990 Federal Environmental Assessment

Review Office panel recommendations to remove diseased bison from the wild and replace them with a disease-free population. In 1996, the Deninu Kue' First Nation and the Aboriginal Wildlife Harvesters Committee, of Fort Resolution and the Government of the Northwest Territories, launched a co-operatively managed recovery project as another option to the northern diseased bison issue. Governments and Aboriginal communities have been in a difficult position to devise a bison recovery plan that recognizes different perspectives, sources of knowledge and values from the variety of stakeholders. Although there are many sides to this contentious issue, this study focuses on the perceptions and views of the community members of Fort Resolution regarding the Hook Lake Wood Bison Recovery Project and the wood bison controversy. This group is likely the least well understood in terms of its perceptions of this project.

1.1 Purpose and objectives of my study

The purpose of this research is to identify and describe the views and opinions held by community members of Fort Resolution, Northwest Territories regarding the Hook Lake Wood Bison Recovery Project and their priorities for the future care of this herd. My study examines the effectiveness of the Hook Lake Wood Bison Recovery Project as perceived by the residents of Fort Resolution. I conducted in-depth interviews with residents to explore individual perceptions held by community members about bison-human relationships and the impacts of the recovery project on the community.

My objectives were to:

1. Determine if the Hook Lake Wood Bison Recovery Project is consistent with the cultural ethics, views, and knowledge of the local people.
2. Describe community priorities regarding the future of the recovery project for captive and wild herds.
3. Describe potential commercial options and opportunities as viewed by local residents arising from the recovery project.

1.2 Significance of the study

This research is intended to be beneficial to the residents of Fort Resolution as well as managers of the Hook Lake Wood Bison Recovery Project. Since the Hook Lake Wood Bison Recovery Project is an on-going project, the results of this study may be used for future management considerations. A sampling of community perspectives provides the project managers with a picture of community priorities and perceptions. Recommendations in this study offers project staff suggestions for community involvement. This research also aims to provide insight to project staff, community governments, and outside agencies (such as the Territorial Farmers Association) in relation to Aboriginal community members' perceptions regarding a potential commercial market for surplus animals and meat. This research contributes to a growing body of research on Aboriginal perceptions of co-management projects and recommends more active communication and exchange among the parties to these agreements.

According to Berkes (1997), co-management theory often neglects the monitoring aspects of co-management agreements. In Chapter 6, I address this issue by examining the provisions in the Hook Lake Wood Bison Recovery Project management plan to monitor community satisfaction and participation. Northern community support for the recovery project and Native involvement in management is essential to finding successful solutions to the northern diseased bison issue, given the historical and current relationship Native people in this region have with wood bison. Accordingly, this research is able to contribute to public and agency awareness of Native perspectives of a contentious wildlife management issue.

1.3 My role

Denzin and Lincoln (1994) refer to the qualitative researcher as a "bricoleur" which translates from French as, "a do-it-yourselfer" (Atkins *et al.*, 1988, 86) where the researcher employs a variety of methods to adapt to the context of the research setting. I possess training in biological, animal, and social sciences, which has allowed me to examine the social and biological issues associated with bison recovery. As a student with a background in environmental sciences, I became interested in the northern bison disease while I was part of the bison recovery project

team. My role was specifically a student volunteer under the guidance of project managers. During the time I spent as a volunteer with the Hook Lake Wood Bison Recovery Project, I interacted with residents on a daily basis, and various other project stakeholders. Accordingly, I became curious about their views on the disease issue and of the recovery project. Later, as a qualitative researcher, I was interested in the opinions of residents regarding the recovery project and the knowledge and experiences that shaped these perceptions. I maintained my role as a student during my time in Fort Resolution. My willingness to learn and listen was instrumental for me to gain acceptance by residents, collect high quality data, and to offer recommendations based on my interpretations of the study results. This research does not attempt to "solve" the northern diseased bison issue, rather, I describe the perspectives within a Native community involved with the issue and a co-operatively managed wildlife project.

1.4 Thesis organization

This research is a qualitative study that focused on the perceptions of community members on a "co-managed" project. In Chapter 2, I describe the community and history of Fort Resolution, the history of the northern wood bison disease issue, and the specific details of the recovery project. In Chapter 3, I explore literature that includes challenges for co-management projects, indigenous knowledge, and Native perceptions of research and wildlife management. I describe the qualitative and ethnographic methods I used to collect data in Chapter 4. In Chapter 5, I describe my results, based on participant and non-participant observation and interviews conducted during the summer months of 1999. In my discussion and conclusions, in Chapter 6, I explore the original goals of the management plan, challenges for the co-management of the bison recovery project, suggestions for the recovery project staff and community members regarding the future of the project, and recommend future topics for related research.

Chapter 2: Background to the study

2.0 Fort Resolution region

The community of Fort Resolution, Northwest Territories is located on the south shore of Great Slave Lake, in Resolution Bay (see Figure 1) and covers an area of 455 square kilometres (Statistics Canada, 2001). Geographic co-ordinates for Fort Resolution are 61° 11' latitude and 113° 41' longitude. The road to Fort Resolution was completed in 1972, linking it to the Mackenzie highway system (Mandeville, 1998). The community is 154 km east of Hay River along Highway 5 and 6 past the junction to Fort Smith. Much of the road is paved and the last 66 km is a well-maintained all weather gravel road. The Slave River Delta system is located northeast of the community and is linked to the Slave River. The Great Slave Lake is the second largest lake wholly in Canada covering an area of 28 568 km² (Statistics Canada, 2002a). The Slave River is 415 km in length extending from the Peace River near Lake Athabasca to Great Slave Lake. This drainage area covers 616 400 km² (Statistics Canada, 2002b).

Fort Resolution accrues an estimated 15 cm of rain and 166 cm of snow yearly (Environment Canada, 2002) with mean temperatures ranging from 10.5 °C to 20.7 °C in July and –39.2 °C to –22.4 °C in January (Outcrop Ltd., 1985). Topography consists primarily of low elevation flatlands with dune and lake sands, dense spruce forests, and low brush marsh areas (Deninu Kue' First Nation, 1992; Reynolds, 1987). The territory around the community provides habitat for a variety of wildlife species including: caribou, moose, wood bison, bears, rabbit, muskrat, beaver, lake whitefish, northern pike, ptarmigan, and various duck species (Deninu Kue' First Nation, 1992; Smith, 1973).

(Source: Federal Environmental Assessment Review Office, 1990, 1)

Figure 1: Map of Fort Resolution and area

2.0.1 History of the people

Fort Resolution is composed predominantly of Chipewyan and Métis peoples; however, other residents are of Slavey, Dogrib, Cree, and European backgrounds (Mandeville, 1998; Smith, 1978). Many people in the community speak English, although most of the Elders prefer to speak "Chip" (Chipewyan). Some Métis people also speak Michif or Patois which may be described as a "country French" (Mandeville, 1998, 3).

Prior to the establishment of Fort Resolution in 1821, many satellite communities existed along major waterways in the Great Slave Lake area, often at the outlet of rivers or creeks (Mandevillle, 1998; Northern Settlements, 1966). The Chipewyan people of this area were highly mobile and ranged from present day areas of Hay River to the east and Fort Reliance to the west of Fort Resolution (Smith, 1973). The many waterways such as the Great Slave Lake and Slave River Delta areas facilitated transportation for the Chipewyan as well as traders and explorers. Dependent upon the season, there was a rich bounty of fish and other wildlife. Some communities were located at areas now known as Little Buffalo River, Rocher River, Jean River, Stoney Point, and Snowdrift (Mandeville, 1998; see map in Appendix I).

In 1786, Cuthbert Grant of the Northwest Company (NWC) and Laurent Leroux of the Gregory McLeod Company arrived on the southern shores of Great Slave Lake, each with the intent of establishing a fur trading post (Northern Settlements, 1966). Intense competition existed between these trading companies and, by 1794, the NWC Slave Fort was the only remaining trading company in the area. This post was subsequently transferred to Mission Island, also known as Moose Island House or Moose-Deer Island, where traders would be closer to the Native people who gathered in Fort Resolution (Mandeville, 1998; Smith, 1978). In 1803, the Hudson's Bay Company (HBC) founded their first trading post, the Chiswick House, but did not maintain a permanent post until 1815 (Smith, 1978). The Fort Resolution trading post was founded in 1821 when the NWC amalgamated with the HBC and relocated from Mission Island to the present day site of Fort Resolution (Mandeville, 1998; Smith, 1982; Smith, 1978). Until the 1890s, Fort Resolution was the only trading post in the Great Slave Lake area and retained a monopoly on the fur trade (Smith, 1982). The establishment of Fort Resolution as a major fur trade site resulted in a growing Métis

population, with Roman Catholic and Anglican missionaries arrived shortly after its establishment. Many Métis in Fort Resolution employed as guides, traders, hunters, and fishermen, "worked for the traders during the transportation season and hunted and trapped during the winter months" (Smith, 1978, 685). The presence and influence of the Métis enhanced the acceptance of Catholicism in Fort Resolution (Mandeville, 1998; Smith, 1978). Carney (1992) credits this close connection to the influence of the Métis and the Hudson's Bay Company (HBC) on the local Dene people. Father Faraud, Oblats de Marie Imaculée (O.M.I.) reached Fort Resolution in 1852, established a mission house in 1856 on Moose-Deer Island, and by 1958 two priests were permanently posted at the mission (Smith, 1978). During the nineteenth century Fort Resolution was well known as a fish post[1] and known for its location along the fur trade route (Smith, 1978).

Mineral discoveries, fertile farmland, and the gold rush of 1896 provided the impetus for the federal government to pursue the settling and boundaries of a new treaty which was described by treaty commissioner, David Liard[2] (Dickason, 1999-2000; Malloch, 1984; Fumoleau, 1974). As a result, the Crown signed Treaty Number Eight[3] (hereafter referred to as Treaty Eight) with local Native Bands in 1899 in Lesser Slave Lake, Peace River, and Fort Vermilion areas and on July 25, 1900 in Fort Resolution, NT (Mandeville, 1998; Fumoleau, 1974; Canada, 1966). At this time, there were at least six separate trading posts, in addition to the HBC, in Fort Resolution making it one of the most significant trading centers in the Great Slave Lake area (Usher, 1971).

---

[1] The post in Fort Resolution supplied traders, other posts, and explorers such as Franklin, Back, Rae, and Richardson with fish, grease, hides, dry meat, and pounded meat (Mandeville, 1998; Smith, 1978).

[2] "The scope of the Commissioners' instructions was to obtain the relinquishment of the Indian and Halfbreed title in that tract of territory north of Treaty 6 to which Governmental authority had to some extent been extended by sending Northwest Mounted Police there to protect and control whites who were going into the country as traders, travelers to the Klondike, explorers, and miners. The territory watered by the Lesser Slave Lake, the Peace and Athabasca rivers, the Athabasca Lake, the South of Great Slave Lake and their tributaries, was where these whites were finding their way, and the Commissioners did not deem it necessary to extend Treaty Eight farther than they did. . ." (Fumoleau, 1974, 60).

[3] Treaty Eight covers areas in northern Alberta, Saskatchewan, northeastern British Columbia, the Yukon, and the Northwest Territories (Dickason, 1999-2000). In 1788 traders of the Hudson's Bay Company made an initial move towards permanency by founding Fort Chipewyan in northeastern Alberta. In 1860, Catholic missionaries such as Bishop Grandin and Father Lacombe traveled throughout Treaty Eight areas. From 1871 to 1977, treaties one through seven were signed.

The signing of Treaty Eight in 1900 assured the schooling of Dene children but made no provisions for children of the Métis (Canada, 1966). Treaty Eight differs from other treaties since it did not specify that Dene people had to be settled on a reserve before they received educational benefits.[4] Thus, the mobility and flexibility to practice traditional pursuits endure longer in northern communities than in southern reserves (Carney, 1992). According to Smith (1978), the signing of Treaty Eight on July 25, 1900 also changed the lives of the people of Fort Resolution, and other First Nation communities, in unexpected and negative ways. For example, Aboriginal groups were no longer in control of their own lands, having traded some of their rights for rations and a small annuity. Other concerns expressed by these community members included government provision of medical services, government survey designations of settlement areas, and the continued right to hunt and trap on traditional lands (Abel, 1993).[5] Consequently, in 1920 and 1937, Fort Resolution was the site of two treaty boycotts as an expression of local dissatisfaction with the terms of Treaty Eight (Dickason, 1999-2000). In addition to becoming subject to Dominion Law,[6] their political structure was altered through the government institution of chiefs and headmen (Smith, 1978). Smith (1978) affirms that the people in state or government-controlled positions usually had limited interaction with individual community members. These early experiences of Native community members with government institutions are important to the social context of current Native-government relations.

---

[4] "Further, Her Majesty agrees to pay the salaries of said teachers to instruct the children of the said Indians as to Her Majesty's Government of Canada may seem advisable." *Treaty No. 8*, 21 June 1899, reprinted from the 1899 edition (Canada, 1966, p 13); as opposed to: " Further, Her Majesty agrees to pay the salaries of said teachers to instruct the children of the said Indians as to Her Majesty's Government of Canada may seem advisable, when said Indians are settled on their reserves and shall desire teachers." *Treaty No. 7*, 22 September and 4 December 1877, reprinted from the 1877 edition (Canada, 1966, p 5).

[5] See Daniel (1979) and Carney (1992) for additional commentary regarding the impacts of Treaty Eight on native communities.

[6] Dominion Law consisted of regulations established by the Dominion of Canada.

St. Joseph's School, the Roman Catholic residential school and residence in Fort Resolution, was open from 1903-1958 and governed by the Grey Nuns[7] (Carney, 1992). The government modified the Indian Act in 1920 so that children between the ages of seven and fifteen were required to attend school (Abel, 1993). This act decreased the mobility and subsistence pursuits of families who wished to reside near their children. In 1903, an orphanage and convent were also built in the community (Smith, 1978). In 1913, a permanent Royal Canadian Mounted Police (RCMP) detachment was established in Fort Resolution (Abel, 1993; Smith, 1978; Fetherstonhaugh, 1938). Many Native people moved into Fort Resolution between 1920-1940 as a result of the influenza outbreak of 1928, subsequent outbreaks of human tuberculosis (*Mycobacterium tuberculosis*), and the need for modern healthcare services (Smith, 1978). Due to these health concerns, a hospital associated with the church and school was built in 1938. This hospital accommodated approximately 100 patients with tuberculosis and provided many jobs for community members until the hospital's closure in the late 1950s (Mandeville, 1998; Northern Settlements, 1966).

With the arrival of trappers and traders in the 1800s, wildlife became a source of material wealth for Native peoples and employment in a wage economy. Methods of hunting soon included the use of firearms and all-terrain vehicles. According to Abel (1993) in 1926, 26 motorized boats were owned by residents (registered with the Indian agency), and this number increased to 61 just three years later. As a result of the introduction of a wage economy and a continued reliance on wildlife, Native people attempted to work in both economic systems.

> Whereas adoption of new means of transport, primarily the snowmobile and outboard motor, have enabled subsistence hunters to range more widely from the home base, the centralisation of subsistence family units into permanent villages with dependence on schools, churches, trading posts, other social services, and permanent housing has brought an end to the nomadism of the past (Klein, 1989, 99).

---

[7] The Grey Nuns was a term used to describe the Oblates of the Mary Immaculate and the Sisters of Charity of Montreal. These women regulated daily life at the school and residences and were part of the Roman Catholic Diocese of the Mackenzie-Fort Smith jurisdiction (Carney, 1992).

A shift in the northern economy occurred during the 1930-1940s with the economic depression and resulted in the decline in fur prices and the closing of the majority of trading posts[8] (Abel, 1993; Bodden, 1981; Smith, 1978). According to Fumoleau (1974), Aboriginal people boycotted treaty payments in 1937 in Fort Resolution because of their concerns about government-imposed restrictions on hunting seasons, inadequate medical and education services, and poor relationships with the local Indian Agent. Smith (1978) describes a deteriorated relationship between government agencies and the residents of the Fort Resolution after World War II.

By the 1940s, resource extraction industries replaced the fur trade as a cash income source for Fort Resolution residents. At this time, the Mackenzie highway was completed up to Hay River furthering economic development and the 'opening up' of the north (Smith, 1978). Fort Resolution and other Native communities objected to commercialized fishing in Great Slave Lake in the 1940s and 1950s arguing that these outside operations were depleting the local fish stocks (Abel, 1993). During the 1950s, the Federal Government increased their involvement with the economy and infrastructure of northern Native communities. The government established old age pension and family allowance payments and opened a nursing station and federal day school in Fort Resolution (Smith, 1978). In 1964, the mining town of Pine Point was established approximately sixty-six kilometres west of Fort Resolution (Bodden, 1981). Few residents were employed at the open pit lead and zinc mine but its development vastly increased accessibility with the expansion of the road from Pine Point to Fort Resolution (Deninu Kue' First Nation, 1992; Bodden, 1981). An increase in government-run programs in northern communities and an increase in resource extraction industries, that did not always provide local employment, created increased strain between Aboriginal people and those they viewed as "outsiders." Smith (1978, 688) summarizes that, by the end of the 1970s, Native people in this area assumed "the White man had the power and chiefs [or the community in general] could do very little to gain for the people what they wished."

---

[8] By 1938, only two trading posts remained in Fort Resolution. One post was operated by Pinsky and Necrasoff who were called "free traders" while the other post was controlled by the Hudson's Bay Company, also known as "the Bay" (Usher, 1971). Today, the Northern Store, once part of the HBC, functions as the local grocery and hardware store, movie rental venue, and the post office (personal observation).

Even now the increased emphasis on the cash economy and wage labor places a strain on the traditional, Native way of life in relation to a more modern, western way of life. Harold Balsillie, a Fort Resolution elder born in 1917, notes the influence of the market economy on traditional lifestyles:

> My children would rather go to work than go trapping. They find it tough going out in the bush and making a living out of hunting. Going out hunting and trapping is a gamble. It is a gamble to make money. If you go to work, you are sure to get paid every two weeks or every month (Balsillie in Beaulieu, 1987, 27).

He further notes that northern communities have been experiencing significant changes in their way of life:

> It was a good life going into the bush and living right off the land. Compared to now it was a different life. I can't tell my kids, 'look here, you're not living right.' They wouldn't live the way I lived my life, they wouldn't do it. The world is changing and they have to keep up with it (Balsillie in Beaulieu, 1987, 97).

Several researchers have noted that continued dependence upon traditional (or country) foods is not based solely on subsistence needs, but supports social and cultural values associated with a traditional lifestyle and linkages with the land (Klein, 1989; Usher, 1976; see Chapter 3). Residents of Native communities have experienced changes in their lifestyles as well as changes in the historical roles of men and women.

2.0.2 Gender

Women in the community were traditionally responsible for duties such as gathering berries, roots, and medicinal plants, trapping small game, and preparing animal hides and food (Mandeville, 1998; Malloch, 1984). In addition, women carried out the practices of childcare, midwifery, education, and were considered the, "carriers of spirituality and culture" (Mandeville, 1998, 3). Women were also responsible for producing mesh for fishnets and snowshoes as well as sewing tents and clothing (Malloch, 1984). "Bush life" would include the whole family; in hunting expeditions women were considered equal partners (Malloch, 1984). "The role of women was considered equal in importance and complementary to that of men" (Ohmagari and

Berkes, 1997, 200). Locally, men were hunters whose primary game consisted of moose, buffalo, woodland caribou, fish, and small game. Community caribou hunts occurred in the fall or late spring months and, prior to contact with fur traders, the most common hunting tools utilized were snares and spears. These weapons, along with decorations, knives, and fish hooks were formed from copper acquired from the Coppermine River, bone or antler parts (Mandeville, 1998). The Coppermine river is 845 kilometres in length, located east of Great Bear Lake. It drains into the Arctic Ocean at Coronation Gulf (Statistics Canada, 2002b).

Residential school and the movement to a more permanent lifestyle in settlements in the late 1940s altered the roles of men and women (Usher, 1986; Smith, 1978). Women were more likely to remain in the community while men went out to hunt and trap (also noted by Ohmagari and Berkes, 1997, in regard to the Western James Bay Cree). Male decision-making usually focused outwards at survival mechanisms regarding movement, organization of hunting camps, and for ensuring the safety of the family and community, while women's leadership was directed inwards toward the family unit.

> Women, because of their special connection with the earth through their female power to give birth, played an important role in maintaining order and balance in the home and the life of the family. Women demonstrated their strength and leadership through skill, competence and awareness with which they regulated the affairs of the home and the family. (Malloch, 1984, 13)

Today, the traditional skills held by men revolve around the hunt while women specialize in crafts and meat preparation (Deninu Kue' First Nation, 1999; personal observation).

2.0.3 Demographics

According to the 1996 Census of Canada, Fort Resolution is classified as a Settlement Census Subdivision Type and has control over local bylaws (Statistics Canada, 1999; Balsillie, personal communication, 1997). The total community population is 562, with 307 male and 255 female members of the community

(Northwest Territories Bureau of Statistics, 2002). The 2001 Statistics Canada Census[9] cites a population of 525 people in Fort Resolution.

The Northwest Territories Bureau of Statistics states that their population estimates include people who may be missed by the census to account for discrepancies with census counts (Northwest Territories Bureau of Statistics, 2002). Fort Resolution is primarily an Aboriginal community with an ethnic distribution of 66.4% Chipewyan Dene and 22.4% Métis peoples.

Table 1: Population of Fort Resolution by gender and age

Age (years)	Male	Female	Total
0-4	30	30	60
5-14	60	50	110
15-19	15	25	40
20-24	20	20	40
25-44	90	70	160
45-59	40	20	60
60-79	35	30	65
80+	0	5	5
Total	290	250	540

(Adapted from Statistics Canada, 1999, 30).

Population numbers for the 15-19 and 20-24 age classes appear lower than expected, but this may be explained by a number of youths that complete their high school and further education training outside the community. According the Northwest Territories Bureau of Statistics (2000), the average household income in 1996 for Fort Resolution residents was $37 163 which is significantly less than the average income in the Northwest Territories ($65 550) and less than the average income in Canada ($48 552). The community of Fort Resolution grew by 4.1%

[9] At this time, the only 2001 Census information available for Fort Resolution, NT was the general population of 525. According to Statistics Canada (2001) the change in population from 1996 to 2001 was –2.1% in this community compared to –5.8% in the Northwest Territories.

between 1991 and 1996, a smaller growth rate than 9.0% for the NT and 5.7% for Canada (Northwest Territories Bureau of Statistics, 2000).

2.0.4 Community Governance

There are three different political structures within the community of Fort Resolution. The Deninoo Community Council (DCC), a municipal government, is composed of an elected mayor and council and is responsible for the maintenance of municipal roads, water delivery, and sewage disposal. The Deninu Kue' First Nation (DKFN) is comprised of chief and council who address and negotiate land claim issues, and initiate and promote economic and community development programs. (The DKFN changed its leadership in November 2001 with the election of Chief Robert Sayine; Don Balsillie was the chief during the majority of this study.) The Fort Resolution Métis Council (Local #53) consists of a president and board council members. Representatives from the DKFN and Métis council and community elders form an Aboriginal Wildlife Harvesters Committee (AWHC), which focuses specifically on wildlife co-management projects such as the Hook Lake Wood Bison Recovery Project (Balsillie, personal communication, 1997).

2.0.5 Local Economy

The community of Fort Resolution has a mixed economy based on containing wage employment, government transfer payments, and subsistence components. Approximately 100 active trappers work on weekends for at least three months in the winter to supplement their income (Balsillie, personal communication, 1997). Roughly 75% of community members actively hunt and fish for food, especially for moose, caribou, bison, and Lake Whitefish (Mandeville, personal communication, 2001). Cull fish is used for bait during the trapping seasons as well as dog food during the winter. The main fur-bearer species harvested is the marten, followed by lynx and beaver, coloured fox, and mink (Mandeville, personal communication, 2001). The majority of hunters and trappers no longer pursue these activities on a full time basis, but rather participate on a part time basis, such as weekends (Mandeville, personal communication, 2001). According to the Northwest Territories Bureau of Statistics (1997), 98% of households consumed harvested fish or meat

with 60% of households participating in the harvesting of these products. This statistical difference between hunters and participating households represents the importance of country foods to residents and that these foods are shared by harvesters with others who are not able to participate in hunting activities.

The labour force (those over the age of fifteen years) consists of 205 males and 160 females with 140 and 90 respectively participating in the labor force (Statistics Canada, 1999). The workforce participation rate for 1996 was 62.2% (Northwest Territories Bureau of Statistics, 2000). The 1996 unemployment rate was 28.3% with rates of 25.0% for men and 33.3% for women (Statistics Canada, 1996). Fort Resolution has a few businesses, such as Stan's Quick Stop, the Northern Store, and John Bjornson Construction that employ members of the community. The community holds a contract to maintain the highway in the South Great Slave region (Deninu Kue' First Nation, 1992). In addition, there are a variety of Government of the Northwest Territories (GNWT) offices located within the community representing various departments such as: Health and Social Services, Resources, Wildlife and Economic Development (RWED), and Public Works and Services (Deninu Kue' First Nation, 1992).

During David Smith's history research in Fort Resolution (1968-1972) he recorded that there was a shortage of local employment and that many community members depended on welfare payments for household incomes (Smith, 1978). Kenneth Bodden (1981) also noted during his fieldwork on the economic use of local resources that local employment opportunities were limited to community and territorial government jobs as well as positions at the sawmill. He further discussed the importance of the sawmill in accommodating full or part time employment. Bodden (1981) reported that, at the time, roughly one hundred men filled the thirty-eight full time positions; this allowed time for residents to pursue traditional activities such as fishing, hunting, and trapping. The Slave River Sawmill (Great Slave Lake Forest Products) employed approximately 25 people for at least six months per annum in the areas of logging, sawmill, and welding work; however, the sawmill has gone out of business since I completed my fieldwork in August 1999.

The combination of subsistence and commercial activities is prevalent in northern communities (Freeman, 1995). An example of such commercial activity was the Edjericon bison ranch in Fort Resolution, located approximately twenty kilometres from town. Bison are important as a source of food for community members (Deninoo Wildlife and Resources Committee, 1991). One goal of the Edjericon Ranch was to provide another source of revenue for the community through the sale of animals to southern bison ranches. Since the completion of fieldwork the bison at this ranch have been sold to a rancher in Alberta. Community members continue to hunt and trap for subsistence (meat) and to supplement their income (Mandeville, personal communication, 2001; Deninu Kue' First Nation, 1992). Crafts made from antlers, furs, and moose or caribou hair are produced on a small scale for local markets (Mandeville, 1998). George (1989) describes the economic development in Northern Ontario Native communities and limiting factors such as the high transportation costs associated with locally-based industries and the integration of wage-based industries with continued subsistence economies. He emphasizes the need for culturally appropriate economic development options for Canadian Aboriginal communities.

> What Canadian native peoples are seeking is a permanent solution that will guarantee their political and cultural autonomy as well as their economic futures. Victory for native peoples will ensure their preferred access to the renewable resource base, enabling them to retain their traditional hunting lifestyles, and provide them with control over future exploitation of the non-renewable resource base and a greater share in the proceeds (George, 1989, 58).

The history and way of life of the people of Fort Resolution is important to this study and the northern diseased bison controversy because it provides insight into the basis upon which the residents form their perceptions of the recovery project and the disease issue. To understand residents' perceptions of the recovery project, it is also important to understand the larger social context for the debate over bison disease.

2.1 Wildlife hunting regulations

Early federal government solutions to decreasing wildlife populations included legislation and enforcement for limiting hunting with patrols by the North West Mounted Police (NWMP) (McCormack, 1992; Daniel, 1979). Early records from Samuel Hearne in 1797 and Philip Turnor in 1791-2 indicate that bison were abundant in the Slave River areas (Soper, 1941; Tyrrell, 1934). The northern bison populations attracted many fur traders in the late 1700s and early 1800s. Fierce competition between the North West Company and the Hudson's Bay Company for trade lasted until the two companies amalgamated in 1821. During this time local fur-bearer and game animal populations, including bison, were devastated (Gates, Chowns, and Reynolds, 1994; Ferguson, 1993). Bison meat was used to support the fort occupants (employees, wives, and dogs) as well as for brigade provisions in nearby areas. By 1840 hunting records kept by fort factors, HBC employees, noted decreased bison populations in the Peace and Athabasca area (Ferguson, 1993).

Wood bison populations were depleted to between 150 and 500 by the late 1890s (Gates *et al.*, 1992; Ferguson, 1990; Soper, 1941). A law that protected the remaining wood bison populations was passed in 1893 (Soper, 1941). On January 1, 1896 the "Act for the Preservation of Game in the Unorganized Portions of the Northwest Territories of Canada" was established prohibiting Native and Non-Native hunting of bison (Daniel, 1979).[10] This marked the inception of government control over bison and other wildlife species in the Great Slave Lake, NT regions. The North West Mounted Police[11] enforced these government regulations. In 1897, Inspector Jarvis initiated the first NWMP law enforcement patrol for the protection of wood bison in the Great Slave Lake, Athabasca, and Peace River regions (Daniel, 1979; Soper, 1941). Six Buffalo Rangers were established in 1911 as game guardians in

---

[10] Section 4 of this act declared that: " except as herein after provided, buffalo and bison shall not be hunted, taken, killed, shot at, wounded, injured, or molested in any way, at any time of the year until the first day of January, A. D. 1900 " (Fumoleau, 1974, 53). Other sections of the act concerned musk-oxen, moose, deer, mink, otter, beaver, muskrat, swan, wild ducks, geese, etc., but apparently only the regulations concerning buffalo were seriously enforced by the police patrols of 1897, 1898, and 1899 (Fumoleau, 1974).

[11] In 1873 the NWMP were established to maintain order in the Canadian west; they were renamed to the Royal North West Mounted Police in 1904, and then to the Royal Canadian Mounted Police (RCMP) in 1919 (see Morrision, 1985; Fumoleau, 1974; Fetherstonhaugh, 1938).

this area to carry out the Royal Northwest Mounted Police bison protection duties (Gates *et al.*, 1992; Dary, 1974; Soper, 1941).

In 1920, Chipewyan, Slavey, Dogrib, and Yellowknife peoples refused to accept treaty payments as a protest to the introduction of the Northwest Game Act in 1917 and the Migratory Birds Convention Act in 1918 (Fumoleau, 1974). These federally-imposed laws called for closed seasons on moose, caribou, muskrats, other animals and migratory birds. Aboriginal people of the area viewed these regulations as a breach of the Federal Government's promises made during Treaty Eight in 1899-1900 (Dickason, 1999-2000; Fumoleau, 1974). Dickason (1999-2000) and Daniel (1979) attest that First Nation communities signed Treaty Eight as an act of good faith with expectations that their 'inherent rights' to trap, fish, and hunt would be upheld without limitations.[12]

In 1922, Wood Buffalo National Park (WBNP) was created to protect remaining wood bison (Gates *et al.*, 1992; Wein, 1993). Warden service was also created with the formation of WBNP and, at the time, bison numbers in the area were estimated to be 1 500-2 000 animals (Soper, 1941; Carbyn, Oosenbrug, and Anions, 1993). Carbyn *et al.* (2000) noted that 119 Aboriginal residents and their direct descendants were allowed to continue their hunting and trapping pursuits in the area when WBNP was established; more recently, Aboriginal resident hunting rights was limited to a total 325 people. In 1949, the federal government continued the trend of hunting regulations and introduced the North West Game Ordinance that required trappers to register individual traplines (Abel, 1993).

[12] "In the morning, the Agent put up a tent... Everyone went over to listen. When we got to the tent there was a table and chairs for the Agent and the interpreter. We sat on the ground on one side. The Treaty Commissioner said, 'We don't come to make trouble. We come for peace and to talk about money. We come for peace. From now on, there will be lots of White men. So if the White men come you will treat them just like your own brothers. And the White man, if they see a poor Indian in trouble, they will help, just like he was their own brother.' " (Fumoleau, 1974, 90).

2.2 Wood Bison management controversy

Dissention between Native communities and the government authorities over the management of northern bison herds dates back to 1893 when hunting restriction legislation was passed. Historically, wildlife has existed as an integral part of life for indigenous people in the Northwest Territories, but with the expansion of "the frontier" and the arrival of settlers, their relationship with wildlife was altered. Wood bison played an important role in this relationship (Ferguson and Burke, 1992). More recently, government responses to a decline in bison populations and the presence of bovine tuberculosis and brucellosis have been to propose a series of bison management plans. The 1991 Federal Environmental Assessment Review Office panel (FEARO) proposal to depopulate the Wood Buffalo National Park herds has resulted in further research and continued debate between governments, Native communities, and other stakeholders regarding a single solution that would be acceptable to all involved.

The recent decline in wood bison numbers is due, in part, to diseases such as tuberculosis (*Mycobacterium bovis*) and brucellosis (*Brucella abortus*) (Nishi *et al.*, 2000; MacEwan, 1995; Foster, Harrison, and MacLaren, 1992). These diseases were likely introduced to the northern wood bison in 1925-1928 during the translocation of 6 673 plains bison (*Bison bison bison*) from Wainwright's Buffalo National Park, in east-central Alberta, to WBNP (Research Advisory Committee, 2001; Carbyn *et al.*, 1993; Federal Environmental Assessment Review Office, 1990). This human intervention in bison populations has been described as an example of wildlife mismanagement (Gates *et al.*, 1992).

Tuberculosis and brucellosis are bacterial diseases of great significance to wildlife and ranching industries of Alberta. Both of these diseases cause a general deterioration in body condition, but tuberculosis impairs the pulmonary system with the formation of lesions on the lungs while brucellosis affects the reproductive system causing abortion, infections of genitalia, and inflammation of the joints (Tessaro, 1992). The potential for zoonoses (transmission of disease from animals to humans) has resulted in mass testing and slaughter of cattle and wildlife. Tuberculosis was first observed in the former Buffalo National Park, near Wainwright,

AB in 1923 while brucellosis was first detected in Elk Island National Park bison in 1946-47 (Tessaro, 1989).

Cross-breeding of the introduced plains bison with the existing wood bison herd of approximately 500 animals in WBNP resulted in hybridization and disease transmission of both brucellosis and tuberculosis (Gates *et al.*, 1992). The WBNP herd was estimated both in the mid-1930s and 1949 at 12 000 animals. Tuberculosis was first identified in WBNP in 1937-38 and Brucellosis was first identified in 1956 (Gates *et al.*, 1992).

In 1953, park officials proposed the first of many contentious, and ultimately rejected, management plans to remove tuberculosis from bison herds through depopulation of the WBNP and area herds with the use of fighter jets from the Royal Canadian Air Force (Carbyn *et al.*, 1993). In 1959, a population of bison phenotypically identified as wood bison were located in the northwestern corner of WBNP, near the Nyarling River (Wood Bison Recovery Team, 1990). They were larger, darker and had a sharp angle of the hump - representative of the wood bison phenotype although there were also indications of hybridization. The Canadian Wildlife Service and the Canadian Parks system initiated a wood bison rescue plan in 1963 to isolate apparent wood bison from northwestern WBNP (Wood Bison Recovery Team, 1990). These animals were corralled and subject to extensive disease testing measures. Eighteen of these wood bison were transferred from WBNP to the Mackenzie Bison Sanctuary (MBS) near Fort Providence, NT in 1963 (Federal Environmental Assessment Review Office, 1990; Gates *et al.*, 1992).[13] In 1965, Elk Island National Park (EINP) received 24 Nyarling River bison and some animals were found to be diseased, another indication of hybridization. These animals were subject to a 'test-and-slaughter' program in EINP (Federal Environmental Assessment Review Office, 1990). Other free-ranging bison herds include: the Nisling River herd (southwestern Yukon), the Nahanni-Liard herd (southwestern Northwest Territories), and the Waterhen herd (Interlake, Manitoba).

[13] As of February 2000 this herd was estimated at 1 998 +/- 163 animals (Nishi, personal communication, 2001).

In 1968, a five-year management plan to fence WBNP and implement a 'test and slaughter' program or eliminate all free-roaming herds was introduced by the Canadian Wildlife Service (Carbyn *et al.*, 1993). This plan was also discarded as a result of opposition from a variety of stakeholders. Fort Resolution and Fort Smith residents raised concerns regarding the loss of bison as a meat source. The Bison Disease Task Force listed other considerations as: widespread public concerns about the environmental and aesthetics effects of a loss of these herds, conflict with WBNP fencing guidelines, and financial and logistical considerations about requirements needed to find all bison and fence WBNP (Nishi *et al.*, 2000). In 1972 a revised plan was presented to observe tuberculosis and brucellosis in WBNP animals and implement a widespread anthrax vaccination program (Carbyn *et al.*, 1993). This plan was not implemented as a result of economic costs and concerns of high bison mortalities associated with round ups. Other contentious management plans included a poison program for the control of wolf populations (1935-1960s) and the anthrax vaccination programs (1964-1977) where WBNP and area bison were rounded up, corralled, and vaccinated (see Carbyn *et al.*, 1993 for details).

In 1970, the mainly hybrid plains bison population in WBNP was estimated at 10 000 animals (Research Advisory Committee, 2001). Since the 1970s, the WBNP herd has been declining due to the pressures of predation, disease, and habitat alteration. Additionally, in 1974, approximately 3 000 bison were killed by a flood in the Peace-Athabasca Delta region (Federal Environmental Assessment Review Office, 1990; Reynolds and Hawley, 1987). In 1978, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the United States Fish and Wildlife Service designated the wood bison as an endangered species. In 1985, the Wood Bison Advisory Group (now the Wood Bison Recovery Team) was established to provide recommendations to government wildlife directors for the management of wood bison. In 1988, wood bison were down-listed from an endangered to a threatened species based on recommendation by the Wood Bison Recovery Team (Carbyn *et al.*, 1993; Federal Environmental Assessment Review Office, 1990). This recommendation was based on population growth of the MBS herd and other herds derived form the Nyarling River herd and tied to the recommendation to allow the commercial use of wood bison (Danz, 1997; Carbyn *et al.*, 1993). The 1990 herd size of bison in the park area was approximately 3200 (Federal Environmental

Assessment Review Office, 1990). In 1999, the free-ranging population of bison in WBNP was 2 200 animals (Research Advisory Committee, 2001).

McCormack (1992, 367) affirmed that, "In the 1990s, a coalition of government departments threatens the park bison with the most serious threat of all, extermination, recommended as a scientifically justified, government sanctioned 'game management' initiative." Gates *et al.* (1994, 157) asserted that management measures were required, "The single greatest factor affecting the availability of historic range and the potential for further recovery of the wood bison is the existence of diseased herds of bison in and around WBNP." There was considerable controversy over this management plan and the FEARO panel's recommendation to eliminate of all bison in the Wood Buffalo National Park area in 1991. In 1985, Canadian cattle herds were declared free of brucellosis and this resulted in attention to the diseased herds of WBNP (Nishi *et al.*, 2000; Federal Environmental Assessment Review Office, 1990).

2.2.1 The solutions?

The Federal Minister of the Environment established the Northern Diseased Bison Environmental Assessment Review Panel (hereafter referred to as FEARO or 'the Panel') in February 1989 to evaluate options presented by the Steering Committee[14] for the future management of northern diseased bison herds of the WBNP area (Federal Environmental Assessment Review Office, 1990). The panel was asked to recommend a solution and assess its impacts on environment, resource conservation, people, and the local economy" (Federal Environmental Assessment Review Office, 1990,1).

[14] The inter-jurisdictional Steering Committee was created in 1986 and included representatives from Canada, Alberta, and the Northwest Territories governments and, in turn, created a Bison Disease Task Force to produce management options for diseased bison in and near WBNP (Federal Environmental Assessment Review Office, 1990). The steering committee reviewed nine options delivered by the Task force and presented four of these options to the Panel (Figure 2).

1. Maintaining the *status quo*;

2. Fencing Wood Buffalo National Park to contain the diseased bison and prevent the spread of diseases beyond the Park boundaries;

3. A composite plan to confine diseases to the Park by a combination of strategically placed fences, buffer zones exterior to the Park from which all bison would be eliminated, and land-use restrictions imposed on cattle grazing; and

4. Phased elimination, with or without salvage, of the diseased herd and replacement with disease-free wood bison.

(Source: Federal Environmental Assessment Review Office, 1990, 15).

Figure 2: Management options presented to the panel

The Panel then produced a document that included reports from technical specialists and the three governments (Canada, Alberta, and the Northwest Territories) in October 1989. This report was then distributed for public review in preparation for public hearings in January 1990 (Federal Environmental Assessment Review Office, 1990). Agriculture Canada acted as the proponent in these hearings and presented their proposal, option 4, that all bison from WBNP and the surrounding area be eliminated and replaced with disease-free animals from established herds such as EINP and MBS (Ferguson and Burke, 1992; Agriculture Canada, 1989). The Panel also recommended this course of action. Disputes between various stakeholders (northern Native communities, governmental agencies, Alberta Agriculture, cattle industries, environmental and heritage organizations, and other non-governmental agencies) existed before and after the recommendations. Concerns regarding disease transmission and risk assessment, the genetic purity of wood bison, and others reflect contentious issues regarding wood bison management that were expressed by Alberta Agriculture and individual biologists. The role of Aboriginal people as managers of wildlife is crucial to this issue and was raised at panel hearings and public meetings (Ferguson and Burke, 1992; Federal Environmental Assessment Review Office, 1990).

Native communities, non-governmental organizations, and the general public reacted strongly in opposition to the Panel's recommendations. In response to this outcry, the federal government established the Northern Buffalo Management Board in 1991 (Research Advisory Committee, 2001). This group was tasked with the design of a disease elimination and management plan for the bison of WBNP and recommended that gaps in knowledge be researched before the management plan was implemented (Research Advisory Committee, 2001; Northern Buffalo Management Board, 1992). Consequently, in 1995, a five-year Bison Research and Containment Program (BRCP) was implemented by the Ministers of Canadian Heritage and Agriculture. This research was designed to explore information gaps relating to the effects of disease on bison and the ecology of WBNP, followed by the designation of a Research Advisory Committee (RAC) by the Minister of Canadian Heritage (Research Advisory Committee, 2001). "The RAC is comprised of representatives of four Aboriginal communities/First Nations, scientific representatives of the Governments of Alberta and the Northwest Territories, a representative of environmental non-government organizations, and a senior scientist from the United States National Park Service" (Nishi *et al.*, 2000, 219).

2.3 Hook Lake Wood Bison Recovery Project

Hook Lake is an area in the Slave River Lowlands (SRL), north of Wood Buffalo National Park. Historically the wood bison population was estimated at 1700 in the area of Hook Lake. Their population numbers declined to 200 by the late 1970s (Reynolds and Hawley, 1987). Since then, the population has increased slightly due to the easterly migration of approximately 200 bison across the Slave River from an area northeast of WBNP. The bison population in the Hook Lake area was 450 in 1996 (1997-98 Progress Report) and 283 in 2000 (Nishi, personal communication, 2002). Hunting pressures, predation by wolves, and poor calf production were reported as factors contributing to low populations (Reynolds and Hawley, 1987).

In 1991, the Hook Lake Wood Bison Management Plan was published by the Deninoo Wildlife and Resources Committee (DWRC) of Fort Resolution as an alternative option to Option 4 of the wood bison management plan (Deninoo Wildlife and Resources Committee, 1991).

> The lands east of the Slave River including North Prairie have always been used by the people of Fort Resolution. These lands are considered community lands. Similarly, the people of Fort Resolution consider wildlife species in this area as community resources which should be managed by local people. This understanding has in large part provided the impetus for this Hook Lake Wood Bison Management Plan (Deninoo Wildlife and Resources Committee, 1991, 10).

Members of the DWRC wrote this management plan with information provided by the Government of the Northwest Territories (GNWT). In 1992, a co-management agreement was signed between the committee and the then Department of Renewable Resources (currently called the Department of Resources, Wildlife, and Economic Development), GNWT. The original management plan was initially rejected by the federal government. In 1995, a revised plan was developed by the DWRC and the Department of Renewable Resources and contained methodological details for each phase of the HLWBRP (Nishi *et al.*, 2000; Deninu Kue' First Nation and Department of Renewable Resources, 1995). In 1996, the Hook Lake Wood Bison Recovery Project (hereafter referred to as the recovery project or HLWBRP) was implemented. This co-management agreement included shared management between the Deninu Kue' First Nation[15] (referred to as the band or DKFN), the Aboriginal Wildlife Harvesters Committee,[16] and the Government of the Northwest Territories, Department of Resources, Wildlife, and Economic Development (Nishi *et al.*, 2000).

---

[15] The Deninu Kue' First Nation are the Dene, Chipewyan peoples who inhabit the Fort Resolution area.

[16] The Aboriginal Wildlife Harvesters Committee is a DKFN sub-committee and includes representatives from the Deninu Kue' First Nation (Treaty 8), the Fort Resolution Métis Local #53, the Elders Senate of Fort Resolution, and the Fort Resolution National Park Users Committee. The committee works with the community and outside agencies on wildlife resource issues while representing the interests of aboriginal wildlife harvesters (Nishi *et al.*, 2000).

2.3.1 Goals and phases

The Hook Lake Wood Bison Recovery Project (HLWBRP) is cited as a pilot project aimed at a "phased approach to disease eradication, genetic conservation, and to the recovery and re-establishment of a healthy wood bison herd in the Hook Lake area" (Nishi *et al.*, 2000, 215). This plan also calls for the renewal of prairie habitat through prescribed fire management. Five goals of the recovery project were identified in the original 1991 management plan and applied to the 1995 management plan. These goals are listed in Figure 3.

1. To restore a healthy herd of wood bison to the Hook Lake area.
2. To preserve the genetic integrity of the Hook Lake Wood Bison.
3. To salvage the existing healthy bison from the Hook Lake area.
4. To preserve and enhance the Hook Lake ecosystem.
5. To explore and recognize the potential commercial opportunities for the Hook Lake wood bison herd.

(Deninoo Wildlife and Resources Committee, 1991, 2).

Figure 3: Goals of the Hook Lake Wood Bison Management Plan

The timeline in the 1991 management plan projected that ten years would be required to achieve these five goals (Deninoo Wildlife and Resources Committee, 1991). Six specific objectives were also listed in the 1991 plan as a means to reach the above goals.

- To establish 25.9 square kilometres of corrals and compounds.
- To round-up the existing wood bison in the Hook Lake area and implement testing, culling, quarantine and salvage programs.
- To acquire an alternative wood bison herd from the Mackenzie Bison Sanctuary or Elk Island National Park.
- To carry out an extensive wood bison breeding program.
- To implement a range enhancement program.
- To ensure a continuous supply of bison meat for the community of Fort Resolution.

(Source: Deninoo Wildlife and Resources Committee, 1991, 2).

The majority of these objectives were adapted into the four phases of the recovery project. Methods used to achieve a disease-free herd include capture of newborn calves from a wild herd of bison in the Hook Lake area, treatment of these animals with antibiotics, and extensive disease testing methods. The recovery project was divided into four phases to address the specific goals of the management plan:

I: Habitat Enhancement,
II: Salvage and Captive Breeding of Hook Lake Wood Bison,
III: Isolation of the Hook Lake Bison Range, and
IV: Recovery of the Hook Lake Herd (Nishi, 1998, 3).

The project facility was originally planned for the Hook Lake area, but due to logistical challenges, the facility was re-located in Fort Resolution. Construction of an isolation facility began in December 1995 in Fort Resolution for the Hook Lake Wood Bison Recovery Project and was finished in the summer of 1996. It was named in honour of Fred Dawson, a respected elder who had hunted in the Hook Lake area. The facility covers approximately forty-two hectares and to date includes two eighteen hectare paddocks, a five hectare pasture, and one hectare containing the handling facility, ten calf-rearing pens, and the main buildings (Nishi, 1998).

The habitat enhancement phase of the project has consisted of prescribed burning of prairies in the Hook Lake area beginning in 1992. According to the 1995 management plan, the habitat enhancement phase of the HLWBRP is to be completed and re-evaluated in 2002 (Deninu Kue' First Nation and Department of Renewable Resources, 1995). Meanwhile, Quinlan (1999) has completed a study of the effect of prescribed burning on the meadows in Hook Lake as well as a comparison of aerial photos of the vegetation cover in the area over a 24 year period (see section 6.1).

The calf-capture phase of the project was initiated in May 1996. Three spring calf capture events occurred from 1996-1999 and a total of 62 bison calves were caught (see Table 2). Newborn bison calves were caught using a net-gun mounted to a helicopter and then transported to the temporary facilities at Hook Lake. In the 1997 and 1998 a bovine brucellosis field test[17] was available and calves were tested prior to transportation to the Fred Dawson facility in Fort Resolution. Calves were kept in pairs and isolated from others in 1.3m x 2.5m wood sheds for at least two weeks (Nishi *et al.*, 2000; Gates, Elkin, and Beaulieu, 1998). During this time the calves were familiarized with people, hand-fed milk replacer in bottles, and given antibiotic injections (Nishi *et al.*, 2000; Gates *et al.*, 1998; see either reference for a complete description of antibiotic protocol). Calves were then transferred to 13m x 23m double-fenced pens and continued to be treated with antibiotics dissolved in the milk and introduced to calf starter, alfalfa-timothy hay, and later rolled barley (Nishi *et al.*, 2000). Animals were transferred as a group into a larger paddock after approximately ten months and individual pens were then prepared for the following capture season. Whole herd tests are conducted by government personnel on each cohort (group of bison, based on the year that they were born) in February and November of every year.[18]

---

[17] The Brewers Card Test (BCT) is a test for *Brucella abortus* antibodies. Calves that had a positive reaction to the test were returned to the herd from which they were captured within approximately thirty minutes of their capture (Nishi *et al.*, In press; Gates *et al.*, 1998).

[18] Tests for bovine brucellosis include the Buffered Plate Antigen Test (BPAT), Standard Tube Agglutination Test (STAT) and the Compliment Fixation Test (CFT) (Nishi *et al.*,2000; Gates *et al.*, 1998).The test for tuberculosis includes the intradermal caudal fold test with *M. bovis* PPD (tuberculin) and a comparative cervical test if suspicious results are obtained in the first test (Nishi *et al.*, 2000; Gates *et al.*,1998).

According to the original management plan, excess bull calves will be produced and could be considered livestock for sale or slaughter during the captive-breeding phase of the recovery project (Deninoo Wildlife and Resources Committee, 1991). A restriction to further development of wildlife industries is the availability of breeding stock (Hudson and Burton, 1993). Surplus wood bison from a disease-free herd would be of great interest to game farming and ranching industries in the area (i.e., the Territorial Farmers Association) since these groups are often interested in the addition of wood bison to their stock. Although the development of diversified agriculture is a possibility, hunting, fishing, and trapping remain important life skills for the sustenance and recreation of residents of Fort Resolution (Beaulieu, 1987). Additional considerations of such economic development projects in northern Native communities include the high costs associated with production and transportation of consumer goods (George, 1989).

2.3.2 Current status

The HLWBRP is currently in the captive-breeding phase of the project. Female bison, originally captured from the wild, were moved into the isolation pens for their last trimester of pregnancy; each cow and newborn calf is tested for brucellosis before being released back into the captive herd (Nishi *et al.*, 2000). At this time, the HLWBRP herd is comprised of 108 bison (see Table 2). All wild-caught females have now had at least one calf and all animals tested negative for brucellosis latency, the potential for infection that shows up during pregnancy (Elkin, personal communication, 2002). Consequently, all female bison will calve in one of the large pasture areas this year (Elkin, personal communication, 2002). Managers[19] of the recovery project are now planning for future options when the herd receives a disease-free designation. Future plans will include continued community consultations and use the results of this study to aid in the understanding of community perceptions (Nishi *et al.*, 2000).

[19] Project managers refer to those in charge of the day-to-day management of the bison in the recovery project. These people do not reside in the community and are ecological and technical specialists, positions that have resulted in their development into *de facto* project decision-makers.

Table 2: Current bison population at the Fred Dawson Facility (Hook Lake Wood Bison Recovery Project). Fort Resolution, NT.

Cohort	Wild-caught calves			Captive-born calves			Herd Total
	1996	1997	1998	1999	2000	2001	
Male	5	4	6	3	10	10	38
Female	13	16	14	4	11	12	70
Total	18 (2)	20 (0)	20 (2)	7 (2)	21 (4)	22 (4)	108

Bison mortalities are not included, but are summarized yearly in brackets. (Adapted from Nishi, Elkin, and Ellsworth. 2001, In press, and Elkin, personal communication, 2002).

2.3.3 Personnel structure and organization of the HLWBRP

The recovery project personnel includes community members and Government of the Northwest Territories (GNWT) employees. The DKFN initially provided for the initial consultation and planning meetings of the project. Currently, the community contributes in-kind administrative support to the project by providing staff hours of the Deninu Kue' Development Corporation's Financial Manager, Stephen Cuthbert. Mr. Cuthbert administers the operational budget for the project and is the direct supervisor of the project herdsman. Kenneth Delorme, a resident of Fort Resolution, is employed as the project's herdsman and is responsible for daily care of the animals and maintenance of the facility. Students from the community assisted with neonatal care during the calf-capture phase of the project. Fred Mandeville, the local RWED Wildlife Officer, and the Fort Resolution Fire Crews have also assisted with the project through the provision of extra labour for several aspects of facility construction and maintenance.

Bison Ecologist John Nishi, Wildlife Technician Troy Ellsworth, and Wildlife Veterinarian Dr. Brett Elkin are involved with the management of the project as part of their duties with the Department of Resources, Wildlife and Economic Development, GNWT. The information in Table 3 has been obtained from draft budget documents of RWED records in order to provide an overview of the financial support for, and costs of, operating the HLWBRP.

Table 3: 2000-01 Budget for the HLWBRP

	Operations ($)	Research & vet services ($)	Total ($)
Contributions (Government of the Northwest Territories)			
FMB contribution	125 000		125 000
RWED bison mgmt. program		28 205	28 205
RWED wildlife health program		24 537	24 537
Other	14 157		14 157
Total	139 157	52 742	191 899
Expenses			
Administrative	353		353
Travel, transportation, & shipping	271	11 510	11 781
Contract services	6 600	7 778	14 378
Wages & benefits	57 037		57 037
Facility construction & maintenance	15 174	2 499	17 673
Vehicles & equipment	6 182	8 510	14 692
Veterinary services & supplies		14 901	14 901
Hay, feed, & freight	45 988		45 988
Utilities (facility)	7 901		7 901
Staff housing & supplies		7 545	7 545
Total	139 506	52 743	192 249

(Source: Nishi, personal communication, 2002).

The bison management program is managed by the South Slave Bison Ecologist while the wildlife health program is managed by the RWED Headquarters' Wildlife Veterinarian. The GNWT allocates $125 000 annually to the project through the Financial Management Board (FMB). These funds are directly committed from the operating budget of the GNWT as per their contribution agreement with the AWHC. In 2000-2001, an additional $14 157 was contributed to the project by the RWED Regional Superintendent, Lloyd Jones (Nishi, personal communication, 2002). Wages and benefit amounts refer to the herdsman's annual salary and benefits as well as wages for casual employees. Contract services have included costs associated with fencing and the clearing of pasture areas (Nishi, 2002, personal communication). RWED provides in-kind support (food and housing) for summer university student volunteers who have come from Alberta, Saskatchewan, and the USA.

According to the 1995 revised draft of the management plan, the community's perspectives regarding the recovery project were taken into account. "Representation of community interests in wildlife management has been assumed by the Aboriginal Wildlife Harvesters Committee, a subcommittee of the DKFN. The AWHC has taken the position that recovery of the Hook Lake herd is feasible through the application of traditional, veterinary and conventional wildlife management practices" (Deninu Kue' First Nation and Department of Renewable Resources, 1995, 1).

Klein (1989) discusses northern Native communities and the cultural and subsistence values they hold about wildlife and hunting practices. He suggests that participation of Native communities in local wildlife management is increasing in the Northwest Territories and increasing self-governance has involved more Native people in the development of wildlife management and policy plans.

> Developing effective management systems for northern ungulate populations to assure their continued well-being and productivity for use by subsistence hunters will undoubtedly continue to evolve as northern peoples undergo the transition to increasing self-governance. The process will require a melding of cultural attitudes toward resource management and use from both native and Western cultures
> (Klein, 1989, 109).

To gain a richer understanding of wildlife management as viewed by Native people, it is important to look at their perceptions and beliefs about appropriate interactions between humans and the environment. Chapter 3 follows with an exploration of indigenous knowledge and an Aboriginal worldview towards wildlife management as well as factors that contribute to the success of co-management-type projects.

Chapter 3: Theoretical Approach

3.0 Introduction

In this study, I explored community perceptions of the Hook Lake Wood Bison Recovery Project and priorities of members for the future care of these bison. During the course of this research project, I became aware of different views held by community residents and how their own ways of knowing influenced their perceptions of the world around them. Freeman (1992) emphasizes the need for an understanding of both Indigenous (Traditional ecological) knowledge and scientific knowledge for the development and implementation of renewable and non-renewable resource management plans. My research approach respects both scientific knowledge (SK) and Indigenous knowledge (IK), and seeks to find areas of overlap and contrast. Both realms of knowledge are applicable to my research into the Hook Lake Wood Bison Recovery Project.

The HLWBRP, as described in Chapter 2, is a co-operatively managed wildlife recovery project. Since similarities exist between the recovery project and other co-management projects, I will begin with a description of characteristics and challenges for co-management projects. Native peoples' perceptions of these co-operative resource management programs are based on a variety of factors and include the influence of Indigenous knowledge (IK). This topic has been greatly expounded on in other literature so I provide only a brief overview of the features of IK. I follow up with a more specific examination of potential factors influencing Native people's perceptions of the recovery project, including the spiritual and materialistic significance of bison, Native perceptions of wildlife research, and the commercialization of wildlife.

3.1 Co-management of resources

Co-management may be described as an agreement between a government agency and another user group, such as First Nations, regarding the shared management of a specific resource (Roberts, 1996; Notzke, 1994; Pinkerton, 1993; Berkes, George and Preston, 1991). The province of Alberta uses the term cooperative management instead of co-management; co-operative management is distinguished as a form of

co-management where a formal agreement between the government and First Nations communities allows for communication and teamwork in renewable resource and environmental issues (Honda-McNeil, 2000). The Government of the Northwest Territories (GNWT) uses the term co-management to describe agreements between Native communities and the territorial and federal governments. The Hook Lake Wood Bison Recovery Project (HLWBRP, or the recovery project) is a project with management responsibilities shared by the Deninu Kue' First Nation (the Band, or DKFN), the Aboriginal Wildlife Harvesters Committee,[20] and the GNWT (Nishi *et al.*, 2000).

Comprehensive claims-based co-management agreements have been established primarily in the Northwest Territories and Yukon, but their origins exist in the James Bay Northern Quebec Agreement, signed in 1975 (see Roberts, 1996; Notzke, 1993). These co-management agreements have been established during land claim negotiation with the federal government as an aspect of Aboriginal rights. This establishment of co-management agreements represents, in part, the movement of Aboriginal people toward self-governance (Johnson, 1992a). Crisis-based co-management agreements, such as the Beverly-Qamanirjuaq Caribou Management Board and the Porcupine Management Board emerged from a concern regarding the status and health of specific species (see Roberts, 1996; Osherenko, 1988a; Notzke, 1994). Evaluation of the success of co-management boards has yielded a spectrum of results. The bison recovery project is not as formal or extensive a co-management agreement, as found in the James Bay Northern Quebec Agreement, the Beverly-Qamanirjuaq Caribou Management Board, or the Inuvialiut Final Agreement. The HLWBRP may be considered a crisis-based co-management project as it was established in response to the northern diseased wood bison issue (declining bison populations and the 'threat' of disease and hybridization to these populations). The HLWBRP also incorporates a variety of stakeholders, such as residents with various backgrounds and opinions, and government employees. Thus, the following challenges to co-management processes may be applied to the recovery project.

[20] See Chapter 2 for a description of these groups.

3.1.1 Co-management challenges

Authors of co-management agreements have often attempted to combine indigenous and scientific types of knowledge for the common goal of resource management between local, Native resources users and outside agencies, and have achieved varying levels of success (see Treseder and Honda-McNeil, 1998; Stevenson, 1997a; Roberts, 1996; Osherenko, 1988b). Many researchers have documented differences between western scientific knowledge and indigenous knowledge systems and cited these features as a major challenge for co-management (Stevenson, 1997a; Berkes *et al.*, 1991; Usher, 1986). For example, the western science system tends to use scientific methods based on the accumulation, organisation, and interpretation of data, while the indigenous system relies upon the sharing of information gathered by personal experiences within the community and throughout generations (Freeman, 1993, 1985; Usher, 1986). Scientifically-based management decisions are generally based on written legislation, and administered through governmental frameworks (Stevenson, 1997a). This is contrasted with the communally-run resources managed by consensus in the indigenous framework (see section 3.2.1 for a description of the differences between Indigenous and scientific-based systems).

Two basic assumptions necessary for co-management are, "First, that local people must have a stake in conservation and management, and second, that partnership of government agencies with local communities and other resource users is essential" (Berkes, 1997, 5). Communication, trust and shared decision-making powers between all partners are pivotal factors for success (Stevenson, 1997a; Roberts, 1996; Osherenko, 1988b). Co-management efforts are complicated when local experts are required to participate in the co-management process in a non-native language and in the use of unfamiliar scientific terms and meanings (Natcher, 2000; Stevenson, 1997a; Roberts, 1996; Notzke, 1993). Equally significant is the challenge that translators face in conveying the meanings of Aboriginal terms in English (Colorado, 1988). Stevenson (1997a) and Berkes *et al.* (1991) stress that the recognition that each system of knowledge has valuable information to contribute, and is important for consensus-based decision-making. "Communication with local communities is essential for building community support for the co-management regime" (Roberts, 1996, 21). Expressions and symbols are embedded in each

culture's language (Holmes, 1988). Agreement upon a common set of terminology, with shared meanings, and translation between the languages of the co-management partners can facilitate better communication and increase the level of trust between parties (Roberts, 1996; Notzke, 1993).

Many researchers emphasize the significance of establishing trust between co-management parties (Wortley, Krogman, and Davidson, 2001; Luhmann, 2000; Treseder, 2000; Byers, 1999; Kruse *et al.*, 1998; Roberts, 1996; Berkes, 1995). Respect for other beings and the environment is also an important value in an Aboriginal worldview (see section 3.3). Treseder (2000, 48) states that, "Co-management with Aboriginal people is a form of cross-cultural conflict management, providing a forum for conflict to be manifested in a potentially productive manner." In order to establish trust each party must respect each other to recognize different points of view. Chisholm, Comin, and Unka (1998) describe the consensus-based approach of the Research Advisory Committee for the Bison Research and Containment Program (BRCP) in WBNP. The RAC is composed of representatives from government and non-government agencies as well as local Aboriginal communities (see Chapter 2 for a description of members of the RAC). Chisholm *et al.* (1998) emphasize the need for patience and trust between all parties to allow all stakeholders to express their concerns, and eventually reach consensus during the decision-making process.

Social exchange between partners and reliance of each partner on the other without the guarantee of reciprocity provides the background needed between those partners for trust to develop (Molm *et al.*, 2000; Williams, 2000). The development of trust between parties is associated with the behavioural actions of each group. More specifically, trust depends on regular exchange between partners and equal power structures during their interactions (Molm *et al.*, 2000). Equally important to this behavioural commitment between partners is an affective commitment, the positive opinions and assessment of one partner toward another (Molm *et al.*, 2000). On-going interaction imparts a greater exchange of information between partners that strengthens the level of trust (Good, 2000; Hawthorn, 2000). According to Molm *et al.* (2000), this is best achieved during reciprocal exchange, when partners relate to each other in an informal setting with no certainty of individual gains.

Many researchers stress that the decision-making process of co-management should include full participation and support of Native communities and the local governments, in order to recognize shared ownership by all partners in such projects (Roberts, 1996; Stevenson, 1997a; Freeman, 1995; Osherenko, 1988b). Johnson (1992a) describes different approaches to resource management and the discord that occurs when management becomes divided rather than shared between co-management parties. "Managers become distinct from harvesters; authority becomes centralized and flows from the top down" (Johnson, 1992a, 8) which, "often has difficulties in producing decisions that are legitimized by local resource users" (Prystupa, 1998). Berkes (1997) affirms that neither top-down government approaches nor solely local approaches to resource management are effective.[21] Some researchers also note that Aboriginal community members need to be actively involved with co-management projects in order to make co-management function at the local, community level (Berkes, 1995; Johnson, 1992). Increased local involvement in co-management projects has the potential to improve local commitment to the project as well as provide a mechanism for local people to express their thoughts and engage in dialogue with other partners (Berkes, 1995). Furthermore, strong personal connections between Native people and area biologists (or other governmental employees) improves dialogue and co-operative relationships between these groups, rather than broadly-defined relationships between Native communities and a group characterized as 'the government' (Kruse *et al.*, 1998). Molm *et al.* (2000) assert that maintaining trust requires the anticipation of continued interactions between parties, in addition to reciprocal exchange.

[21] Berkes (1995) and (1994) compares state-level (government) and local-level management systems. Characteristics used to describe these systems are similar to comparisons between IK and SK (Table 4) and comparisons between 'traditional' and ecological-based management systems (Table 5).

Improved communication and trust between those who hold Aboriginal and scientifically based management knowledge bases also requires commonly defined goals (Treseder, 2000) and shared meanings that are expressed in both culturally and scientifically acceptable language. Co-management parties should be well versed in each other's cultural perspectives and respect any differences. Part of the goal of the bison recovery project was to develop a program incorporating these two knowledge systems and to co-ordinate management between the community of Fort Resolution and the Government of the Northwest Territories.

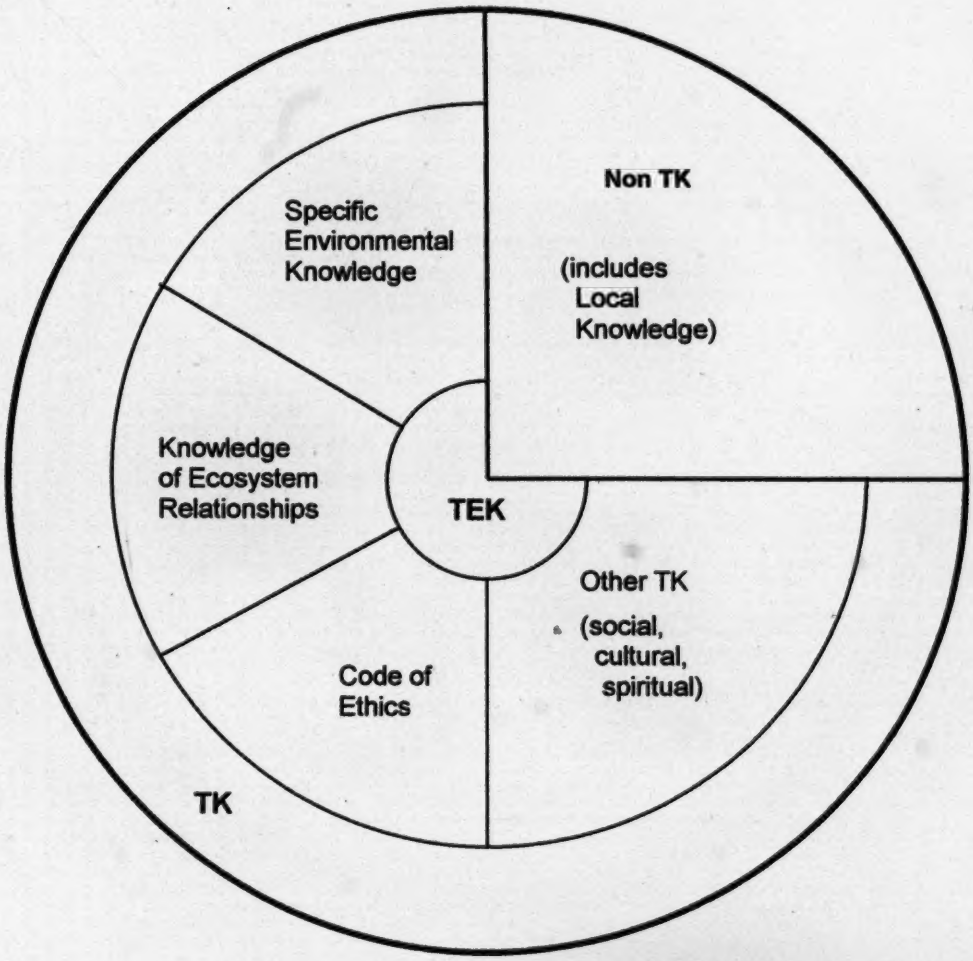
Berkes (1997) emphasizes the significance of the monitoring and implementation processes in co-management agreements. He points out that these processes influence the success of project, yet they are frequently omitted in co-management research (Berkes, 1997). (In Chapter 6, I examine provisions in the original HLWBRP management plan for monitoring community satisfaction.) Indigenous knowledge systems are an important component of co-management projects between government agencies and Native communities since they are an influencing factor in Aboriginal worldviews. Aboriginal perspectives about their rights to traditional pursuits are an important component of co-management agreements (Berkes, 1995) rooted, in part, by traditional land use and corresponding Indigenous knowledge.

3.2 Indigenous knowledge

The Department of Culture and Communications, Government of the Northwest Territories defines knowledge as "the condition of knowing something with familiarity gained through experience or association" (Bielawski, 1992, 6). The "ways of knowing" held by community members aid in the construction of each community's knowledge base and belief system, and influence community members' decision-making processes. Aboriginal knowledge systems are also grounded in the social and political environment of the time (Johnson, 1992a). "Different cultures have different ways of understanding, perceiving, experiencing, in sum, defining reality" (Cashman in Stevenson, 1993,4). Byers (1999, 671) explains that Dene and Inuit philosophies are grounded in hunter-gatherer societies, "a contextual foundation different from that of most Canadians," who have roots in agriculture-based societies. Indigenous knowledge or Traditional ecological knowledge is important to this study

since this knowledge system contributes, in part, to Aboriginal worldviews and therefore, Aboriginal perceptions of science-based wildlife management projects like the HLWBRP.

I use the term Indigenous knowledge in this thesis to describe the vast body of knowledge held by members of indigenous communities, inextricably linked to cultural norms and ways of life that includes both ecological and traditional knowledge (Eyzaguirre, 2001; Berkes, 1999b; Kruse *et al.*, 1998; Johnson, 1992a, b). Figure 4 provides a visual example of the variety of knowledge types included in IK, emphasising the circular nature of an indigenous worldview. Indigenous knowledge is comprised of both traditional and non-traditional knowledge components. The traditional knowledge (TK) component of IK is comprised of specific knowledge of the surrounding environment, knowledge of how the interconnected parts of the environment interact, and the proper ways one should interact with the environment (Stevenson, 1998). Traditional ecological knowledge (TEK) is considered as an element of TK (Berkes, 1999b). Other TK includes social, cultural, and spiritual beliefs and norms held by members of the Native community (Stevenson, 1993). Non-traditional Knowledge (Non TK) may include locally-defined knowledge and is often gained, in part, through interactions with outside technology, through media sources, science, or education knowledge systems (Stevenson, 1998).



TK = Traditional Knowledge
TEK = Traditional Ecological Knowledge
Non TK = Non-Traditional Knowledge
(Adapted from Stevenson, 1998)

Figure 4: Indigenous knowledge

Traditional ecological knowledge (TEK) may be visualised in Figure 4 as the inner circle of traditional knowledge. TEK has been defined by a variety of sources, but here are two definitions that are often quoted:

> [TEK is] a body of knowledge built up by a group of people through generations of living in close contact with nature. It includes a system of classification, a set of empirical observations about local environment, and a system of self-management that governs resource use (Johnson, 1992a, 4).

> A cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (Berkes, 2001, 109).

TEK is known by a variety of designations - folk ecology, ethnoecology, knowledge of the land, or indigenous knowledge (Johnson, 1992a). Transmission of traditional skills and knowledge was altered with adjustments to a more settled lifestyle (see Chapter 2). Land was perceived as more than a specific location, but a way of living learned through interactions with what non-Aboriginal people call 'the wilderness' (Fast and Berkes, 1994; McCormack, 1996).

The importance of traditional knowledge is becoming more widely accepted (Eyzaguirre, 2001; Roberts, 1996; Feit, 1994; Freeman, 1993; Johnson, 1992a; Freeman, 1985). An increase in the advocacy for Aboriginal rights and the growing environmental movement has bolstered pressure on the political front for governments to recognize indigenous knowledge. In the 1992 report of the United Nations Conference on Environment and Development, Principle 22 stated that:

> Indigenous people and their communities and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development. (United Nations, 1992).

In Figure 4, interactions occur within and between the two levels of the circle (Stevenson, 1998). For example, the detailed knowledge of the environment and ecological relationships influences the code of ethics when Native people interact with wildlife. The circle of IK may also be affected by interactions with outside influences, such as non-traditional knowledge gathered from media sources, western science, and schooling systems (Stevenson, 1998). I provide a brief comparison between Indigenous and Science-based management systems in the next section.

3.2.1 Indigenous knowledge, traditional ecological knowledge, science, and management

Traditional Ecological Knowledge (more recently referred to as Indigenous Knowledge) and Western scientific knowledge have often been portrayed as diametrically opposed entities (Ferguson and Dunnigan, 1998; Stevenson, 1997a). The over-emphasis on these differences often makes it difficult for these two systems to function co-operatively (Ferguson and Dunnigan, 1998). The purpose of this section is not to compare scientific and indigenous systems of knowledge, but to describe their potential contribution to co-management.

Table 4: Characteristics of Indigenous Knowledge and Scientific Knowledge

Characteristic	Indigenous Knowledge	Scientific Knowledge
Worldview	Cyclical, holistic All being equal Spiritual	Linear, reductionist, Hierarchical Mechanistic
Understanding of knowledge	Subjective, emotional Intuitive	Objective (mechanistic) Analytical
Gatherers of knowledge	Inclusive, collected by those who live there	Restricted, collected by specialized researchers
Acquisition of knowledge	Cumulative, collective experience	Formal education Experimentation & scientific methods
Type of knowledge generated	Longitudinal, diachronic[22] Qualitative Interpretive	Synchronic[23] Quantitative Based on theory
Transmission of knowledge	Oral histories (stories)	Written (text)
Decision-making based on knowledge	Communal	Management level (top-down)

(Adapted from Ferguson and Dunnigan, 1998, 9).

[22] Diachronic data refers to information that is collected in a small region over a long period of time (Johnson, 1992a,b).
[23] Synchronic data refers to information that has been collected in a larger region over a relatively short period of time (Johnson, 1992a).

In Table 4, I have summarized a typical comparison between IK and SK. Some scientific methods practitioners may be uncomfortable or unfamiliar with the concept of Indigenous knowledge, so I will describe commonly cited distinctions between IK (TEK) and western science. TEK is holistic and intuitive in nature and involves a subjective and emotional point of view, while western science is primarily reductionist, analytical, and objective (Berkes, 1993; Johnson, 1992a, b; Colorado, 1988). As TEK is a system of knowledge built up by a group of people, it is therefore communal in nature. The nature of thinking in TEK is intuitive, including emotion and subjectivity. Knowledge is gained with ongoing contact with nature and data gathering is through personal experience and exchange of information with others (Johnson, 1992a). All entities in the natural world, such as trees, water, and animals, have a spirit and are interconnected with each other (Colorado, 1988). Johnson (1992a) elaborates that the relationships between all beings are equal; humans do not have the right or authority to dictate the lives of other creatures (see section 3.3).

Data collected from TEK is qualitative and diachronic as opposed to western science's quantitative, selective, synchronic data (Ferguson and Dunnigan, 1998). The data collected in TEK usually cover long term trends over long periods of time (thousands of years) for a specific, small geographical area (Johnson, 1992a). The origins of the data are inclusive because those who live and interact in the specific area also collect them. Women and elders often function as the gatherers of knowledge (Ohmagari and Berkes, 1997; Mandeville, 1998). Knowledge is passed down to future generations by the elders of a community. The students or youth learn from these teachings, develop their own "theories" from experience in the environment, and in turn pass on this information to others (Ohmagari and Berkes, 1997). Recording and transmission of TEK information occurs via oral history methods. Stories are shared verbally and through shared experiences (Stevenson, 1997a). Decision-making processes develop over generations and are often associated with living in close contact with nature (Guyette, 1983). While TEK is associated with cumulative, dynamic, and continually evolving knowledge (Johnson, 1992a; Ferguson and Dunnigan, 1998), the scientific method stresses hypothesis testing and repetitiveness to disprove and modify existing theories (Popper, 1974).

Western science utilises written, textual material to convey information gathered from context and concept-driven scientific research. The ability to describe, explain, and predict in the simplest manner possible are the criteria used to judge scientific knowledge. Validation of research findings is achieved by repetition (replication) of the experiment or study under similar settings. By 1920, Karl Popper had reached the conclusion that "the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability" (Popper, 1974). More recently, this idea emerges in the principle of tentativeness: "Scientists do not regard their conclusions as final, but are willing to modify them if they are contradicted by new evidence." (Field, 1985,11). According to many researchers, science, like other disciplines, has its own set of values (Denzin and Lincoln, 1994; Hoare, Levy, and Robinson, 1993; Gamble, 1986). "Any science as a cultural product has a specific human purpose and therefore carries those class biases and values which scientists hold as a group" (Fals-Borda, 1988). Thomas Kuhn also examined the culture of scientific communities and described paradigms as changes in beliefs or shifts in the knowledge building process (Kuhn, 1970).

There is a definite spiritual component to TEK while western science discounts animism (supernatural factors, Ferguson and Dunnigan, 1998) with the scientific principle of materiality (Field, 1985). Instead, science relies upon models and theories that are to be tested. While scientific methods are beneficial to species population counts and sustainable yields, resource allocation issues are not addressed (Usher, 1986).

The inclusion of TEK in resource management has raised concerns regarding the spiritual nature of TEK.[24] According to McCay (1998), 'traditional' forms of natural resource management were based strictly on scientific principles. Characteristics of this management strategy are similar to the characteristics of western science in Table 4. Scientific thought has since departed from traditional, positivistic and reductionist theories and moved toward an ecosystems-based approach. Table 5 shows typical characteristics of scientific and ecosystem-based management of natural resources.

Table 5: Comparison between scientific and ecosystem-based management

Scientific-based management	Ecosystem-based management
Utilitarian Values	Utilitarian and 'Land Ethic' values
Production-oriented (Maximum Sustained Yield)	Humbler science, accepting uncertainty Adaptive management (learning by doing)
Single-species population	Multiple-species, habitat, interactions
Scientific monopoly on data & analysis	Active, engages human communities
Deterministic scientific models	Respect for, and use of, knowledge and experience of resource users
Top-down, Government, and expert-based	Bottom-up, collaborative Bioregional governance

(Adapted from McCay, 1998, 1-2).

[24] Howard and Widdowson (1996) contested the use of TEK in the Environmental Impact Assessment of the NWT BHP diamond mine. They stated that the inclusion of TEK in scientific papers imposes religious beliefs on the scientific community and general public. Berkes and Henley (1997) and Stevenson (1997b) responded to these claims with an explanation that spirituality is not equivalent to religion and that science is not always impartial.

These newer fields of science, such as ecology, examine larger biological systems, the functioning of their interconnected parts, and thus increasingly inclusive of the social sciences and economics (Holling, 1998; Freeman, 1984). This change in paradigm is reflected in co-management institutions for resource management between resources users and governments or industry (Natcher, 2000). The interdisciplinary nature of this holistic approach relates closely to IK and TEK ways of understanding natural processes (DeWalt, 1994; Berkes, 1992; Johnson, 1992b). TEK and integrative ecological science knowledge system paradigms may be viewed in a cyclical format. The scientific method, or the "cycle of proof " (Field, 1985, 10), represents the process by which knowledge is gathered, and concepts are evaluated in order to describe the natural world. TEK is also cyclical in nature as it emphasises the continual cycle of learning.

3.3 Aboriginal community perceptions

Poirier and Brooke (2000) explain that Native people's knowledge of and experiences with the land shape their perceptions of environmental issues. Traditional land use and knowledge were passed down to children through oral traditions of elders in the community and family (Osherenko, 1988c; Malloch, 1984). Children would learn by observing and mimicking traditional activities and by assisting and then fully participating in bush skills (Ohmagari and Berkes, 1997). Traditional ecological knowledge of Native people in Canada is frequently tied to a worldview where all parts of the environment are inter-related (Johnson, 1992b) and Aboriginal identity is connected with the land (Stevenson, 1997a; Little Bear, 1986). The following quote represents a commonly held Native approach to the environment.

> The earth provided the Dene with everything they needed to live – shelter, fuel, food, water, medicine, tools, and clothing. In turn, the earth and the cycle of seasons made demands on the people, teaching them to practice certain ways of living that would ensure harmony between the Dene and the natural world (Malloch, 1984, 7).

Respect for the land, wildlife, and relationships with the environment are central themes in an indigenous worldview (Appiah-Opoku and Hyma, 1999; Sherry and Vuntut Gwitchin First Nation, 1999). These indigenous perspectives influence community perceptions of the recovery project, wildlife research, and human relationships with bison. The value of sharing is rooted in the co-operative roles held by Aboriginal people while living on the land. All people shared in the roles and responsibilities of daily life, such as the hunt (see section 2.0.2). Hunters would provide for their families as well the elderly or infirm (Malloch, 1984). The following sub-divisions of section three focus on examples of how IK informs Aboriginal perceptions of wildlife, scientific-based research, and the commercialization of wildlife.

3.3.1 Spiritual and material significance of bison

Historically, bison have been important to Native communities for material goods and spiritual traditions (see Chapter 2).

> The buffalo, as a major species in the environment, is perceived as spiritually very powerful, as holding the highest position among the four-legged animals. In contrast, domesticated cattle, disease-free or not, are perceived as having lost their self-awareness or spirituality (Ferguson and Burke, 1992, 202).

The value of hunting is often more than merely the meat acquired but includes a spiritual and cultural link with the land and a way of life (Freeman, 1995; Ferguson and Burke, 1992; Usher, 1976). Studies mentioned in Fast and Berkes (1994) link hunter-wildlife relationships to a hunter's identity and social relationships. Subsistence is a concept greater than the dictionary definition of, "a means of keeping alive" (Barnhart and Barnhart, 1987, 2088) but represents relationships and cultural attributes within Native communities (Ohmagari and Berkes, 1997; Fast and Berkes, 1994; Ferguson and Burke, 1992; Usher, 1987).

> The Dene also recognized that all things in nature have a spiritual as well as physical aspect which must be respected. For this reason an offering was always made when hunting, fishing, or gathering food or medicines, to honour and thank the spirit of the earth and of the animal or plant whose life had been offered so that Dene might live (Malloch, 1984, 9).

People within Native communities still maintain a connection with the bush and harvesting country foods despite changes in hunting patterns and the movement away from a nomadic lifestyle (Myers, 2001; Fast and Berkes, 1994; Usher, 1976). With the expansion of stores in the north, frozen and tinned meats are more readily available, but are still viewed as less desirable than country foods (Ferguson and Burke, 1992; Usher, 1976). Residents attending the 1990 FEARO panel hearings spoke of bison as an important and healthy food source for northern communities, a concept echoed by Ferguson and Burke (1992).

Traditional activities such as hunting can be difficult to quantify since such activities are associated, at some level, with many other activities that enhance cultural identity. For example, hunting may provide educational opportunities for younger generations, social and physical health benefits from country foods (Fast and Berkes, 1994; Usher, 1976), as well as systems of sharing and reciprocal exchange (Fast and Berkes, 1994). In relation to the Hook Lake Wood Bison Recovery Project, the people in the community are concerned about the availability of the bison as a resource.

> Fort Resolution's interest in bison management and particularly the management of the Hook Lake wood bison, stems from the traditional and contemporary dependence in this species for food (Deninoo Wildlife and Resources Committee, 1991).

Central to Native people's relationships with wildlife is the belief that interactions with wildlife should be approached with the utmost respect (Appiah-Opoku and Hyma, 1999; Huntington and Fernández-Giménez, 1999; Berkes, 1988). Failure to respect human-nature relationships may have serious repercussions for the person who offended an animal or the environment. Enwereji (1999) noted that the Igbo people of Nigeria expressed the opinion that their people become infected with tuberculosis (*Mycobacterium tuberculosis*) due to a variety of factors. For example, one view held by Igbo people is that humans who mistreat the environment insult local, land-based deities and become infected with tuberculosis. The Igbo's perceptions of the causes of tuberculosis in humans were strongly embedded in their cultural values and beliefs (Enwereji, 1999). The role of humans as part of the environment is reflected in Aboriginal philosophies of wildlife management.

3.3.2 Native perceptions of wildlife research and management

When examining Native perceptions of wildlife research it is first important to look at the experiences of Native people with earlier forms of research (social sciences). Native people have experienced some negative effects of early research. It should be noted that the treatment of participating communities was not due to the malicious intent of researchers, but the standards of research protocol of the time (see Guyette, 1983).[25]

For most Native bands, harvesting wildlife is a socially and culturally acceptable method of procuring country food (Byers, 1999; Fast and Berkes, 1994). By following appropriate hunting practices the animal is treated with respect (Sherry and Vuntut Gwitchin First Nation, 1999; Stevenson, 1997a; Freeman, 1996). These concepts are shaped by TEK and reflect animistic beliefs. Animism is a belief system in which animals and objects including the earth and air possess a life force. In the context of animal-human relationships, wildlife can recognize if they are being treated with respect and communicate their responses to human actions (Berkes, 1999a; Byers, 1999; Fienup-Riordan, 1999; Fitznor, 1998). Failure to demonstrate the proper regard for these natural laws often had serious consequences (Appiah-Opoku and Hyma, 1999; Byers, 1999; Berkes, 1988). The current hunt could be affected by direct acts of aggression from the animal on humans; the hunter or his family could experience nonspecific difficulties such as bad weather, or poor health; or the prosperity of subsequent hunts could be jeopardized (Byers, 1999). Historically Native people, such as the Dene, maintained a hunter-gatherer way of life to adapt to fluctuations in the environment. Their adaptation shaped their worldviews.

[25] Preliminary research in TEK by anthropologists and scientists was originally restricted to local identification methods of plant and animal species (Johnson, 1992a), but have since expanded to encompass natural resource management. Researchers often used "informants" to answer questions. Communities became wary of the "secretive nature" of community research (Guyette, 1983) and the control by non-native researchers over information and ownership of research (Kowalsky *et al.*, 1996; Hoare, *et al.*, 1993).

> In this belief system [animism], all animals are regarded as social, reasoning creatures...and should be shown respect by man...A harvest of fish or game animals is successful only because the wildlife permit the harvesters to catch them. The hunter must be worthy of his prey (Byers, 1999, 672).

The worldview held by those valuing TEK is cyclical in nature and each component is dependent on others and parts of the natural world (Stevenson, 1998; Hoare *et al.*, 1993). In this view, humans are part of a natural system shared by all organisms and function as caretakers, but not controllers of the land (Fitznor, 1998; Malloch, 1984). The power over nature was held by the animals themselves or by a greater spirit and was not to be 'managed' by humans (Byers, 1999; Sherry and Vuntut Gwitchin First Nation, 1999; Stevenson, 1998, 1997a; Malloch, 1984). Moreover, attempts to manage one species may have detrimental effects on other species as well as the whole ecosystem (Byers, 1999). For example, in the 1990 FEARO panel hearings concerns were raised about the effects of eliminating the wood bison population on predator-prey relationships between moose and bison with wolves and the effects on the bison-plant relationships in the grassland communities (Ferguson and Burke, 1992).

Furthermore, the appropriate and honorable methods of treating animals preclude the intensive handling of live wildlife or the attachment of various apparatus to the animals' bodies, such as radio-collars (Byers, 1999). Johnson (1992a) explains that Aboriginal people perceive these wildlife management practices as an expression of domination over the natural environment. "Scientists are viewed to be constantly tagging and capturing animals or digging holes in the ground" (Johnson, 1992a, 15). Gwitchin people from Old Crow have expressed concern with radio-collaring and with capture methods that they claim has resulted in a disturbance of 'the natural order' or lifecycle of the caribou (Sherry and Vuntut Gwitchin First Nation, 1999). Byers (1999) and Stevenson (1997a) also repeat that some Native people view the handling or capture of animals for non-hunting purposes as disrespectful. The animals that are handled or captured may be insulted and feel that they are no longer required by humans for subsistence (Byers, 1999; Stevenson, 1997a).

In reference to the northern diseased bison issue, Ferguson (1989) illustrates local Native peoples' apprehension about threats to appropriate relationships between humans and bison as well as the existence of the rights of bison. Such threats to proper human relationships with bison include harassment of animals during capture or wasting meat when animals die during the capture process.

> For many Native Canadian cultures, it appears that the essence of this equality [between humans and other species] lies in a relationship of mutual rights and obligations operating between the hunter and the hunted...Respect for the animal is also shown in the manner of killing. There is a concern about the potential for causing distress to the animals in any slaughter that may involve, for instance, driving by helicopters (Ferguson, 1989, 211).

Native communities involved with the northern diseased wood bison issue view bison as a sacred animal that deserved respect (Notzke, 1994). Thus, many Native people may be at odds with the practice of capturing wildlife, especially when events such as the anthrax vaccination program in WBNP and HL herds occur.[26] Anthrax (*Bacillus anthracis*) outbreaks occurred in the Hook Lake area in 1962 and subsequently in 1964 in WBNP (Dragon and Elkin, 2001; Tessaro, 1989). In 1965, in response to these outbreaks, an anthrax vaccination program was initiated by a federal initiative of the Health of Animals Branch and was carried out by Parks Canada and Agriculture Canada staff (Elkin, personal communication, 2002). The program was cancelled in 1977 due to internal and public concerns regarding bison mortalities and opinion that the program was costly and ineffective (Dragon and Elkin, 2001; Carbyn *et al.*, 1993). Wobeser (1992) describes the difficulties associated with the round-up and vaccination of bison. Only a third of WBNP animals were captured, approximately 1100 bison died from anthrax, and more than 600 bison died as a result of injuries sustained during the capture and handling phases (Wobeser, 1992). In a recent paper, Dragon and Elkin (2001) estimated that 828 bison died as a result of handling during the capture and vaccination project. This extrapolation was based upon consistent mortality rates at each round-up area and did not include bison that died several days following the roundup (Dragon and Elkin, 2001).

---

[26] See Dragon and Elkin (2001) and Carbyn *et al.* (1993) for a complete description of anthrax and events surrounding the vaccination program in the WBNP regions.

Although problems have occurred during wildlife management projects and many Native people are leery of scientific-based management practices, some researchers (Byers, 1999; Johnson, 1992a) have offered recommendations to improve relationships between wildlife managers and Native communities, including community consultation and incorporation of indigenous knowledge into management projects. Johnson (1992a) and Byers (1999) suggest that when Native people are able to be actively involved, and are knowledgeable about wildlife management projects, they gain a better understanding of the basis for research. An extension of this concept is that increased interaction among project managers and local Aboriginal people allows both parties to gain a better understanding of each other and, with shared decision-making powers, more acceptable projects can be developed and managed over time.

3.3.3 Native communities and wildlife commercialization

The commercial harvest of ungulates by Aboriginal people in Northern Canada has been described as an economic development option that may be culturally consistent with traditional lifestyles (Dragon, 1998; Hudson and Dezhkin, 1989). Many Aboriginal communities, especially in northern regions, rely on wildlife species for food resources as well as cultural values (Fast and Berkes, 1994; Freeman, 1985; 1995; Usher, 1976). Notzke (1994) echoes the importance of culturally appropriate practices to Native communities during commercial hunts. She lists three criteria from the general manager of the Labrador Inuit Association for the development of successful Aboriginal commercial hunting of caribou. These include local control over the hunt, the use of methods that respect traditional hunting customs, and the transfer of the proceeds from the hunt to community members (Notzke, 1994). An additional concern for the local Inuit people was that they did not want this commercial venture to interfere or threaten the success of local subsistence hunts (Notzke, 1994). Berkes (1988) describes the Native perception that all animals killed should be consumed, a belief that opposes hunting solely for recreational purposes.

The Waterhen project, "operates within the framework of joint venture and co-management with the province providing the land base and the Indian band providing management and labour" (Notzke, 1994, 143). This project was initiated in Manitoba in 1984 when thirty-four wood bison from EINP were transferred to the northern Interlake area (Gates *et al.*, 1992). Goals of this project include founding a free-roaming, wild herd of bison in the Interlake district, providing a source of wood bison for future re-population efforts, and commercial ventures to sell breeding stock and generate meat products (Notzke, 1994). The Waterhen project differs form the HLWBRP in that all founding animals for the Waterhen herd originated from disease-free, captive populations (Gates *et al.*, 1992). In 1991 this project successfully released thirteen animals to the nearby wilderness (Gates *et al.*, 1992).

3.4 Conclusion

Berkes (2001) suggests that a traditional worldview espousing the strong connections between people and the environment may contribute to the conservation of biodiversity. Bridging the gap between the natural and social sciences can address the challenges of wildlife management and conservation (Machlis, 1992). In the case of the Hook Lake Recovery Project, community members of Fort Resolution have played a pivotal role in the initiation, development, and implementation of a plan to restore a nearby wood bison herd (Nishi, et al., 2000). "Co-management will succeed where relationships are built on common goals, mutual understanding, and respect" (Roberts, 1996, 89). Perhaps it is not necessarily the integration of scientific and traditional ecological knowledge, but the inclusion of both systems of knowledge in managing relationships between humans and the environment. Further, wildlife (or resource) management should be approached as a continually evolving process that is highly dependent on social systems (Natcher, 2000). The success of the bison recovery project and lessons learned along the way can be applied to other management programs that rely on the co-ordination of efforts between indigenous people and other stakeholders, co-operation between scientific and Native communities, and co-management of resources.

Chapter 4: Research Methods

4.0 Introduction

The purpose of my research was to identify and describe Fort Resolution residents' perceptions of the Hook Lake Wood Bison Recovery Project. Data was gathered to document the history, management, and cultural importance of wood bison, and residents' insights into the northern diseased wood bison issue and the future direction of the HLWBRP. The initial literature review focused on Traditional Ecological Knowledge and qualitative methodologies. In this study, I combined elements of ethnography, participant observation, and in-depth interviews to gain a detailed perspective on the perceived relationships that residents held about the bison recovery project. I chose qualitative methods because they melded well with an indigenous knowledge worldview (see Chapter 3). I conducted 30 semi-structured interviews with residents of Fort Resolution and kept a log of my informal conversations with other community members. My acceptance by Fort Resolution residents was greatly facilitated by my previous volunteer work with the bison recovery project in the summer months of 1997 and 1998. Kowalsky *et al.* (1996) and Anderson (1993) state that community-based studies should benefit the community of study, and as such, one of my research goals is to share my findings with residents, community leaders, and HLWBRP staff.

4.1 Review of Objectives

My study describes the views and opinions held by community members of Fort Resolution regarding the HLWBRP and their priorities for future management of this herd. I conducted in-depth interviews with residents to document historical and traditional knowledge of wood bison, and how the community's traditional knowledge systems are applied to bison, bison habitat, and the management of the recovery project. My objectives included an exploration of the consistency of the HLWBRP with the local cultural ethics, views, knowledge, and community priorities for the future of the recovery project. Additionally, I explored commercial options and opportunities as perceived by the local residents.

4.2 Description of research approach

I preferred to use interpretive qualitative methods in this study to gain a greater insight into the daily lives of participants and their perceptions of the world they live in, specifically in relation to the recovery project. Qualitative research is multi-faceted, incorporating a variety of methods to examine and interpret the meanings behind everyday social situations and events (Denzin and Lincoln, 1994). As such, qualitative research attempts to gain insight into the meanings of peoples' lives.

Qualitative research endeavors to include the social context that influences the respondent, focusing on process rather than measuring quantities and variables by deductive methods (Denzin and Lincoln, 1994; Neuman, 1997, 1991). Positivist science is often used in quantitative research approaches as "an organized method for combining deductive logic with precise empirical observations of individual behavior in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity" (Neuman, 1991, 46). The quantitative researcher is removed from those being researched and data gathered is judged on the basis of objectivity and repeatability (Denzin and Lincoln, 1994; Neuman, 1991). Interpretive science researchers collect qualitative data for, "the systematic analysis of socially meaningful action through the detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds" (Neuman, 1991, 50). In qualitative research, each respondent's 'way of knowing' is based on a set of views and opinions affected by life experiences (Marshall and Rossman, 1995). Qualitative research requires that the researcher exhibit tenets familiar to the natural sciences such as clearly defined procedures, documentation of results, and a concern for achieving accuracy and creditability for results. The researcher must also posses a genuine interest in the community and an empathy for it's members so as to achieve a greater understanding of the processes and meanings that influence respondents (Miles and Huberman, 1994). Given the personal experiences of community members with bison and past bison management practices, a description of local attitudes toward, perceptions of, and priorities for the recovery project are best explored through qualitative methods.

I included elements from ethnographic research methods to better incorporate life experiences of residents and how these are associated with their perceptions of the Hook Lake Wood Bison Recovery Project. Ethnography is a specific area of qualitative research that studies a group of people in a particular culture or community (Fetterman, 1998). Ethnographers employ data collection methods of participant observation and in-depth interviewing (Marshall and Rossman, 1995). Face-to-face interviews allow for a richer, more in-depth exploration of the meaning the HLWBRP has for local people and how it is tied to their desired relationship with bison in the region for years to come.

Elements of Traditional Ecological Research are included in my qualitative, ethnographic methods. TEK researchers often focus on: the amount and form of TEK that people have retained and use, their practices and beliefs associated with management of natural resources, and the degree of traditional management practices employed by the community (Johnson, 1992a). TEK components of my research were focused on the accounts of residents who identified key relationships between the recovery project and their knowledge of appropriate bison-human relationships.

In order to gain a richer understanding of the 'community perspective' and TEK, I encouraged people to talk about their lives ('stories') and how these stories related to their perceptions of the recovery project. Open-ended questions used in qualitative research are well-suited for interviews with Native people because they allow the participants to respond to the questions without restricting their responses into pre-conceived categories, as well as elaborate and add their own ideas, concerns, or stories (Johnson, 1992a). For example, a few male elders recounted their experiences with early bison management by describing their impressions of the treatment of bison during the anthrax vaccination program roundups from 1965-1977. Historical stories of wildlife management and interactions between managers (biologists, scientists) and community members are relevant to residents' perceptions of current bison management and relationships with recovery project managers (see sections 3.3.2, 5.1).

TEK research is usually specific to certain communities and includes direct involvement by local residents. In keeping with TEK research standards, I worked with two community liaisons and a translator as part of the entry stage of my research (see section 4.3.1.1). Such latitude is important in research that ventures into a new subject area, especially with an indigenous population.

4.3 Approval of research

I acquired approval from the community and was granted a scientific research permit from the Government of the Northwest Territories. I obtained informed consent from each participant, and promised each person that I would keep their identity confidential in the reports and papers associated with this study. I received permission from the DKFN on behalf of the community of Fort Resolution prior to conducting this research. My visibility in the community prior to the initiation of research established rapport with many community members and provided a positive influence on the "entry and acceptance" stage of my research. Chief Don Balsillie acted as a liaison on my behalf by presenting my proposal to council. I subsequently received a letter of approval from the Band to conduct my research within the community in 1999.

On March 10, 1999, this study was accepted under the umbrella of the Wildlife Research Permit, WL002059, for the Hook Lake Wood Bison Recovery Project. This permit was granted by the Director of the Wildlife and Fisheries Division, Government of the Northwest Territories and renewed in December 1999 as required to conduct research in the north. Copies of this permit were sent to the Aurora Research Institute, Fort Smith regional biologist, Fort Resolution Renewable Resources Officer, and Deninu Kue' First Nation (Aboriginal Wildlife Harvesters Committee).

4.3.1 Community acceptance

An important consideration for the success of research conducted within Native communities is the entry of the outside researcher into the community (Kowalsky *et al.*, 1996; Anderson, 1993; Erasmus and Ensign, 1991). Social acceptance of the researcher by the community of respondents is meaningful in qualitative research (Punch, 1994). My acceptance in the community existed (and persists) for a variety of reasons. The time I spent in Fort Resolution in April-August in 1997 and 1998 allowed me to interact with community members on a daily basis, be visible around town, and to be known as a HLWBRP volunteer. I was able to casually interact with members of the community who visited the bison facility as well as those in everyday settings, such as the Northern Store or Band office.

Community approval occurred on an on-going basis with each individual respondent's consent and participation in the interview process. Occasionally, participants would drive up beside me (I usually walked everywhere in town) to tell me additional thoughts regarding our earlier conversations. More often I would maintain contact with participants through informal conversations at local gathering places (Band Office, Northern Store, Elders Facility). All of these observations were recorded in a journal during my times in the field.

4.3.1.1 Community liaisons

I had assistance from a translator, Dora Unka, and two community liaisons, Richard Simon and Lloyd Norn, who introduced me to other community members and facilitated my smooth entry into the community. The background and experience with the community held by these people allowed me to gain a greater insight into the culture of this northern Native community. Erasmus and Ensign (1991) noted that when living with a Dene family, correct etiquette was to knock, say hello, and then enter the dwelling as well as help oneself to food on the stove or in the refrigerator. I found this protocol to be a normal behaviour even for myself upon entering the home of one of my participants. It was helpful to have my translator guide me through these behavioural norms and ensure that I did not overstep any boundaries or offend anyone. I gained considerable insight from liaisons who showed me appropriate

ways to behave and I believe this awareness strengthened my acceptance in the community.

Dora translated interviews with elders who did not speak (or preferred not to speak) English. I chose my translator based on her knowledge, experience, and my previous contact with her family in 1997 and 1998. Dora Unka grew up in the community, went away to school (completing translation courses and a Bachelor of Arts degree in Native Studies from the University of Calgary) and returned to work in her community and nearby communities. She provided invaluable assistance to help me initiate contact with several people in the community, especially elders, and she translated and interpreted the meanings of the Chipewyan conversations on the audiotapes of interviews.

Once in the community during my field study season, I realized the importance of a local contact number of someone in the community familiar with my research. One of my community liaison persons, Lloyd Norn, as well as Chief Don Balsillie, a highly visible person in the community, were my community contacts. These two people could direct residents to me or my supervisors for any questions about my research. Mr. Norn and Chief Balsillie's phone numbers were also included on my participant information sheet.

4.3.2 Human ethics considerations

Successful community research entails an adherence to cultural sensitivity and community approval. Cultural sensitivity involves, "research done with a raised consciousness concerning the impact of a culture on: 1) the persons and/or phenomena being studied, 2) on the research process itself and 3) perhaps most importantly, on the researcher" (Henderson in Kowalsky *et al.*, 1996, 269).

My research application was approved by the University of Alberta Human Ethics Review Committee on 8 April 1999. Before initiation of data collection, an ethical review of research or studies involving human subjects had to be completed. I included a description of research protocol and copies of data collection instruments in my application to the Ethics Review Committee (see Appendix II for copies of my

interview guide, participant information sheet and consent forms). Each participant in the study signed a consent form to allow me to use the interview for my thesis research and resulting reports and publications.

4.3.3 Researcher neutrality

I maintained a persona as an outsider with respect to community politics, as recommended by Erasmus and Ensign (1991). While I felt it was important to interact within the community setting, it was equally important to maintain a neutral standing as an impartial researcher. Although it was important for me to participate in daily community life, I was also cautious about delving in too deeply; it was important to maintain a professional distance from my participants to avoid the appearance that I was 'taking sides' (Erasmus and Ensign, 1991). While I felt that it was vital to participate in the daily activities of community life, it was especially important in this community for me to not become overly involved in any particular area or with one particular group of people. For example, I did not want residents to perceive that my interviews were geared toward those in political power, that is, supported either of the two powerful extended families who were characterized as involved in an ongoing feud for the past two hundred years.

4.4 Interview guide development

A qualitative interview is composed of questions that are simple, clearly defined, neutral, and open-ended (Fetterman, 1998) avoiding questions that are biased, leading, multi-dimensional (i.e., complex in nature), or based on false premises. Dr. Naomi Krogman provided much insight and assistance for the enhancement of my interview guide. She encouraged me to focus on key issues already identified in the literature in cases where a new science-based program is introduced to a Native community, and previous areas of sensitivity that I had already learned about in my summer fieldwork.

Questions were generated in the following areas: background information (for example, personal history, relationships with wildlife, hunting procedures), causes and prevalence of bovine tuberculosis and brucellosis in bison herds, perceptions of

and involvement with the recovery project, priorities for future management of the recovery project herd and Hook Lake herd, and perceptions of the FEARO hearings.[27] This interview structure allowed the respondents to discuss their perceptions of the impacts of the HLWBRP on their community.

I included as many open-ended questions as possible in my interview guide to allow participants to develop their thoughts, ideas, and further express their opinions in a culturally appropriate setting. Consequently, interviewees had the opportunity to describe their experiences and stories, which often provided the reasoning behind their responses to each question. As suggested by Anderson (1993), I noted that participants also introduced subjects that were overlooked or previously not known to the researcher as areas of concern. For example, in one of my early interviews, the respondent brought up concerns that poison in the Hook Lake used for wolf population control in the 1960s was still present in the area and may be causing sickness in other wildlife populations.

4.4.1 Pre-test in the field

I pre-tested my questions with my two community liaisons as well as with my translator, and made necessary modifications. Initially I planned to start each interview with questions pertaining to the Hook Lake Wood Bison Recovery Project, followed by questions relating to bison diseases, the northern diseased bison issue hearings and finish with questions about the respondent's background and personal information. While pre-testing my questions, I found that people were most comfortable starting with the personal questions and then leading into ones related to bison and disease issues. By first asking the interviewee to describe their own life they were set up as a knowledgeable source, the expert of their own life. This procedure builds confidence, allows the participant to become more relaxed, and provides an opportunity for them to describe information they may feel is relevant or pertinent to the development of their point of view. I observed an increase the

[27] The Federal Environmental Assessment Review Office held a public hearing in Fort Resolution on January 19, 1990. The purpose of holding these FEARO hearings in northern communities was to allow public response to specialist reports, information from government agencies, and Agriculture Canada proponent's report (Federal Environmental Assessment Review Office, 1990).

comfort level of participants as they began the interview by talking about what was most familiar to them. In TEK research, the researcher takes the role of a student which promotes co-operation and allows the researcher to interpret meaning and context in interviews (Anderson, 1993). As a 'student,' I had a greater opportunity to gather explanations of situations or background information. Such explanations may not have been offered to a local researcher where information is often assumed to be already known (Guyette, 1983).

4.5 Description of sample

The purpose of data collection was to obtain a representative sample of community members to document their impressions of the project, not all of who were necessarily directly involved in the project. I used a purposive snowball sampling technique rather than a random sample in order to gain a range of opinions and views. The sample was purposive in that I deliberately selected participants that had either interest, knowledge, or experience with the HLWBRP. The sample was a snowball sample because I asked key participants to recommend other appropriate community members to interview. I asked for recommendations of people who were well-informed but who did not necessarily hold the same view as the current respondent, in order to represent the full range of community perceptions. As a result, my sampling is not random, but purposeful to gain a full range of responses (Morse, 1999). This type of sampling is preferable to random sampling given the importance of understanding influential community perceptions of the HLWBRP, and for obtaining richer, fuller data about the basis for such perceptions. It was important for me to focus on participants who had opinions about the HLWBRP since many residents know very little or, in some cases, nothing about the recovery project. A random sample would have likely resulted in a less informed sample of respondents.

Thirty in-depth, semi-structured interviews were conducted in Fort Resolution during May – August 1999 as well as participant and non-participant observation that continued from December 1999 – July 2000. I initiated interviews first with elders.[28] It is important to talk to the elders in a community as they observe the historical conditions of various decisions where such has never been recorded. In addition, by documenting their stories, elders may provide great insight into cultural changes that have occurred within the community (Hart, 1995) throughout the operation of the bison recovery project.

Twelve women and eighteen men were interviewed. Twelve of these participants were elders (seven male and five female). The majority of interviews were conducted at the residence of the participant. I interviewed one husband and wife couple at the same time; all other interviews were conducted with one person at a time.

4.5.1 Access to participants

My age, gender, and race did not prove to be a limiting factor for my data collection or participation with daily life in the community. Although a couple of 'planned' interviews did not occur, these were entirely due to extraneous factors. No one refused to talk with me, in fact, most were quite eager to share their opinions and to tell me "their story." One individual, a daughter of a study participant, expressed some initial concerns regarding my research and the use of the results. She felt that their family had been negatively affected by research in previous years when a male researcher interviewed her family about the northern diseased bison issue and then produced a report that recommended the elimination of the WBNP and area bison. Before the interview progressed any further I sat with this person, explained my experiences in the community and the objectives of my research. I gave her a copy of my information sheet where I described the questions that I was hoping to answer. Not only was I able to dispel any skepticism, but that person then requested that I return the following week to carry out an interview with her. This was a rewarding experience for me since my research was accepted as valid in words, but more

[28] Elders were defined as community members over the age of sixty who possess significant IK. Couture (2000, 40) attributes special qualities to elders including, 'a non-romantic, brilliant sensitivity to the dimensions and patterns of manifestations of the natural world.' Other, younger interviewees who possessed such knowledge were also key participants.

importantly seen as important by this person's desire for personal involvement. I was able to communicate my sincere interest in listening and learning about the people of this community; perhaps this was my most important personal goal as I undertook this project.

4.6 Data collection in the field

I requested to tape record (audio only) or to hand-write notes during each of the interviews. Most agreed with tape recording and I guaranteed confidentiality and anonymity as per ethical principles for conducting research in the north (Human Ethics Review Board, 1999). I noted that although some participants were hesitant while I set up the tape recorder, they appeared to forget that the device was present after we began our conversations. The small size of my tape-recorder and microphone allowed me to place them inconspicuously on a nearby table, instead of in very close proximity to the respondent. I recorded most of the interviews, although at times shut off the tape recorder if the participant appeared uncomfortable. I did not tape five interviews at the participant's request.

I assigned a number to each interview to correspond with the category of participant and interview in order to provide anonymity (Hart, 1995). Names and specific positions of participants were removed from interview records. I also wrote notes during some or following each interview to aid with the subsequent transcription of the tapes and the formulation of follow-up questions (Hart, 1995). These notes were also necessary in cases where the interviewee did not allow the interview to be tape-recorded. When I deemed tape-recording and note taking to be intrusive and limiting to the freedom with which the participant expressed his or her feelings, mental notes were made and then subsequently recorded. Copies of the interviews were provided where respondents requested them. Two participants requested and received copies of their tape-recorded interviews. A family member of one of the participants (and the participant) required that the original tape be returned and that no taped copies be created as a condition for the interview to be conducted. I provided this participant with a copy of the written transcript and I was also given consent to keep a copy of this transcript. By complying with these requests, I strengthened the bond of trust between community residents and me.

As stipulated in the human ethics approval from the University of Alberta, no outside agencies will have access to my interview cassette tapes or fieldnotes. This stipulation also requires that these tapes will be destroyed following the completion of my thesis. Ongoing communication between respondents and myself has ensured that information has been exchanged, and shows shared involvement with and co-ownership of this research (Anderson, 1993).

4.6.1 Observation

Observation may occur at many levels, from full participation to a complete lack of participation. I concur with Erasmus and Ensign's (1991) suggestion that the researcher should not try to act out a particular role, but 'be herself' when interacting with the community. Although I maintained a professional demeanor throughout my stay in the community, it was also easy for me to be my normal friendly self when interacting with others.

Participant observation is the observations of the researcher interacting with the study surroundings. Researcher participation in the research setting improves observations. "Immersion in the setting allows the researcher to hear, see, and begin to experience reality as the participants do" (Marshall and Rossman, 1995, 79). Participant observation involves various degrees of immersion of the researcher into a culture and plays a key role in ethnography and qualitative research by allowing participation within the culture and careful observation (Fetterman, 1998; Marshall and Rossman, 1995; Morse, 1994).

The nature of community invitation and acceptance to outside research is not always conducive to note-taking by the researcher during participation. Building trust requires that the researcher commits scenarios and actions to her memory, and then documents these as soon as the opportunity permits (Stenhouse in Husen and Postlthwaite, 1985). The majority of my notes were made after I participated in an event or interview. It was more culturally acceptable to attend community gatherings without my notebook.

As I was conducting my research, I was able to attend and participate in a variety of community events. Firstly, there was a fish fry where many people gathered in the hall parking lot and ate freshly caught Whitefish from Great Slave Lake. I also accompanied Fort Resolution elders at drum dances and talent shows at the Hay River Dene reserve, and I was given the opportunity to join in a circle dance and a scarf dance, local dances that emphasized beliefs in acceptance and inclusion of all and sharing. I participated in a spectrum of spiritual activities – I attended church conducted by Sister Joan and I was invited to participate in two sweat lodge ceremonies. Each of these religious activities emphasized basic principles of honesty and faith in the Creator (or God). Reference to these belief systems appeared in many of the interviews. These experiences improved my knowledge of community relations, contributed to my acceptance in the community, and gave me the opportunity to share information with residents. As well, I was more aware of references to these belief systems during my interviews. In addition to cultural events, I was able to attend a HLWBRP project update meeting in the community. I maintained careful notes in a logbook to document descriptions of these events for my thesis.

Family proved to be an important factor in community life and strengthened community support for my acceptance. My parents visited me in the community in the summer of 2000 and during their stay I was able to introduce them to several people in the community. Afterwards, several residents approached me, voiced their approval of close family connections, and appeared pleased that I returned to the community to live and that my family would travel to see me.

In January 2000, I began volunteering with the Reading Circle which consisted of a group of adult volunteers who assist children under 12 years of age with their reading skills. To say this is a rewarding experience would be an understatement, as it has allowed me to give back to the community on an ongoing basis. We usually met once a week for one-and-a-half hours, although the group broke up after about three months. In February 2000, I was invited to attend a caribou-hair tufting class led by a local craftswoman. This allowed me to meet regularly with a small group of women in the community, gain insight into their daily lives and concerns, and learn a local craft.

4.6.2 Informed consent

Informed consent is an essential duty to conduct research with human beings (Punch, 1994). As such, an information sheet was provided to participants that outlined the purpose, objectives, and methods of my research project. I read the information sheet to each interviewee and Dora translated between English and Chipewyan when required, and left the information sheet for each participant. This information sheet also contained contact information for two community contacts, my supervisors in Edmonton, and my contact information in Fort Resolution and St. Albert. I offered a verbal summary (translated by Dora) of my introduction and experiences to Fort Resolution through volunteering with the Hook Lake Wood Bison Recovery Project and my interest in the community's perceptions about the recovery project. I described my contacts in Fort Resolution, the approval process I had through the Band, and requested and welcomed feedback, questions, concerns, or recommendations regarding my project during any stage of my research. I explained to each participant that they could refuse to answer questions or end the interview at any time. I also included reassurance that the interview transcripts would not be accessible to other parties, and that I would be providing a report and presentation to the community upon completion of my research.

Each participant signed a consent form (or made their mark, "X") before the interview was conducted. Many interviewees disliked the concept of the consent form. Some respondents viewed this as a request for sensitive information (Anderson, 1993) while others appeared to be uncomfortable with the need to write their permission. As a result, many were suspicious or appeared to find the consent form silly. My experience with the people of Fort Resolution was that if someone agreed to talk with you, their participation in the interview or conversation is their informed consent. I tackled this hurdle by explaining that my school and teachers for my project required completion of these consent forms. All participants accepted this as a suitable explanation and each participant signed a consent form.

4.6.3 In-depth interviews

I used a semi-structured interview for the instrument of this research (Marshall and Rossman, 1995). Questions generated were based on areas of particular interest, topics that residents spoke of during my volunteering with the recovery project in 1997 and 1998. The questions in my interview guide functioned as guidelines to answer the research questions, but I used a semi-directed interview technique to allow for participant input into the direction of interview. The in-depth interview technique was combined with elements of observation (the interview setting and the participant's general behaviour) to maintain a "conversation with a purpose" (Kahn and Cannell, 1957, 149). I used primarily open-ended questions for each interview and where appropriate, followed up with probe questions. This interview structure allowed the respondents to discuss their perceptions of the impacts of the HLWBRP on their community. An essential component of my qualitative interviews was my ability to actively listen to and even empathise with the participant (Marshall and Rossman, 1995; Rubin and Rubin, 1995).

I carried a map of the area surrounding Fort Resolution to my interviews for reference. Elders did not make use of the maps; however, it was helpful with my discussions with younger hunters when discussing their traplines. For reference to bovine tuberculosis and brucellosis, I had a field guide produced by the Department of Resources, Wildlife and Economic Development to use as a reference. A few people expressed special interest in this booklet, so I acquired extra copies to distribute to participants. This too gave me an opportunity for return visits and continue interaction with community members.

Interviews were conducted at the convenience of the participant. I anticipated an initial interview with the possibility of follow-up sessions if necessary. I requested one hour for each interview, but actual times ranged from ten minutes to over three hours per interview. After each interview I made careful observations in my notebook about the environment and atmosphere of each interview. I have listed a sample of observation categories that I used during data collection in Table 6.

Table 6: Observation categories for interviews

Verbal expressions	Non-verbal expressions	Distractions
Tone of voice Language Jokes, stories Length of response Asking questions Pauses, silences	Eye contact Posture Movement	Location of interview Presence of others Background noise (TV) Phone calls

Throughout my interviews, literature review, and discussions with my community liaisons, I learned to carry myself during fieldwork and interviews in a way that was more culturally suitable. For example, Dene people, especially elders, do not use extensive eye contact during conversation. As well, pauses or silence breaks in conversation are much longer than would be expected in a non-Aboriginal interview. Again, my prior volunteer time in the community and my good working relationship with my liaisons enhanced my skills as a qualitative researcher in this community.

An interview fee to compensate participants was not necessary for this study; however, a spiritual and culturally respected practice of offering of tobacco to elders was used to show appropriate respect and create a more culturally sensitive and suitable interview process.

4.6.4 Translation and transcription of interviews

Six in-depth interviews were entirely conducted in Chipewyan and an additional four interviews were conducted partly in Chipewyan and partly in English. These were fully translated in writing after each interview. The majority of these interviews were conducted with elders and my translator would provide a short summary during the interview process. Dora stated that she conducted a 'meaningful translation' rather then a "literal translation" of interviews. The former refers to capturing the meaning of the words that are spoken rather than a word-for-word translation. I had developed a good rapport with her since I knew her daughters well and had had several formal

and informal discussions about my research objectives and methods with Dora. I was concerned she was not always giving me an exact translation. I did not speak Chipewyan, but I was able to recognize some words and I kept track of the respondents' demeanor (facial expressions, gestures, tone of voice) as a method to verify the translation (see Table 6). Occasionally, Dora would initiate an unrelated conversation with the participant, for example, talk about family members, or past family stories. At times, I was concerned that these interruptions would distract participants from the interview. There seemed to be a balance between allowing these side conversations that appeared to further relax the respondent during interviews while ensuring that questions were covered during the allotted interview time.

Even though my translator greatly assisted with the interviews conducted with elders, she did not always translate everything that was said and would only summarize responses during the interviews. I was challenged to ensure that I received thorough responses, so I modified the interview process with the assistance of my translator to ensure complete interviews.

All Interviews conducted in Chipewyan (tape recorded, or hand-written notes) were translated into English by Dora Unka and then I transcribed her notes into electronic form. I understand that the grammar in the Chipewyan interviews would be that of the translator. I began transcribing my interviews during data collection in order to follow up on any questions, clarifications, or inconsistencies in the interviews. After I had completed the majority of transcribing, I was required to seek assistance with a few interviews that were conducted in English due to chronically inflamed wrists that prevented me from typing for long periods of time. I reviewed all transcripts and compared them with the original interview tapes to ensure the accuracy of transcription. I wanted to express the views of participants in their own "voice" and as a result I chose not to correct the grammar in quotes from interviews. I did add words in square brackets to make the meanings of the quote more coherent to the out-of-context reader.

4.7 Data analysis

I initiated data analysis after completing all of my fieldwork. I organized my data by first reading through each transcript until I was familiar with the main concepts expressed in all of the interviews (Marshall and Rossman, 1995). I followed up by generating broad categories from concepts or subjects that were repeated in each interview. I then used coding procedures to further analyze my interview transcripts where each code reflected a subject, concept, or theme. The coding process involved the constant comparison of data and categorization according to subjects, themes, or concepts (Strauss and Corbin, 1990). Firstly, I used open coding procedures as described by Glaser (1978) and Neuman (1997). I broke my data down into categories, first by writing notes in the margins of transcripts and then transferring these themes onto a single page (Treseder, 2000). I continued my analysis by following axial coding methods as described by Strauss and Corbin (1990) to put together the data after open coding. As clusters of codes emerged in each category I compared each code within and between categories. For example, I compared respondents' perceptions of the project with their knowledge of the project, their involvement in the project as well as with their views toward the appropriate relationships with the environment and their personal information. Figure 5 shows the initial categories and sub-categories that I coded for my data analysis.

Figure 5: Initial coding categories for data analysis

I. Relationships with the environment

Interactions with wildlife, bison (i.e., hunting procedures)
Treatment of wildlife in wild and captive areas

II. Hook Lake Wood Bison Recovery Project

Knowledge of project
- initiation, project goals, phases

Involvement with project
- visiting facility

Relationships with project staff
- communication, trust

Future priorities for care
- project animals (release, keep in town)
- wild HL herd (status quo, eliminate, fence)
- potential economic development

III. Disease

Aetiology (causes of tuberculosis & brucellosis in bison)
Are many bison infected?
Is the occurrence problematic?
- necessary treatment

IV. Personal

Age
Gender
Occupation
Background, history

As their stories unfolded, topics of particular interest, such as hunting practices, were often discussed and followed-up with questions pertaining more specifically to bison populations. Participants knew that I was especially interested in their knowledge of bison history, the bison recovery project in town, and their opinions regarding the future of the bison (as explained in my verbal introduction and information sheet). This process not only allowed me to gather necessary information but also resulted in the documentation of stories.

4.8 Verifying initial results

After completing my fieldwork and classes at the University, I lived in Fort Resolution for six months. The time I spent in Fort Resolution following data collection allowed me to follow-up on interview questions and maintain my connection with residents. Anderson (1993) and Erasmus and Ensign (1991) advocate continued consultation and interaction between the researcher and the community of study to re-enforce the importance of the community's role in the research process and verify study results. I used various methods recommended by Miles and Huberman (1994) to avoid biased conclusions. For example, I included purposive sampling to collect data from residents with different points of view, took time away from the community to prevent co-optation,[29] and employed different data collection methods (interviews, participant and non-participant observations). I used observation and interview methods as a check on each other to verify the themes generated from fieldwork.

During the Treaty Number Eight Centenary celebrations (July 20-29, 2000) I spent time at the HLWBRP display. This gave me an opportunity to discuss some of the early themes of this research with other community members, and participants, as well as meet people from other communities. My preliminary findings from the coding of interview transcripts were presented in Fort Resolution on November 21, 2000. Prior to my travels to Fort Resolution I spoke with representatives from the Deninu' Kue' First Nation, Fort Resolution Métis Council, Deninoo School, and Aurora College as well as other contacts to announce my 'Community Presentation and Sharing Session' through word-of-mouth. Copies of invitation posters to my presentation were placed in prominent locations throughout town and an announcement was read during the Community Bulletin and Chipewyan news programs on CBC North Radio. I was more confident that my research results made sense to community members after informal discussions at the Treaty Eight celebrations and my community presentation.

---

[29] Co-optation occurs when the researcher replaces her own viewpoint for those of the study participants. The researcher is, "co-opted into the perceptions and explanations of local informants" (Miles and Huberman, 1994, 263).

4.8.1 Rigour of my study

Rubin and Rubin describe reliability as research that could be repeated by other researchers who would make observations similar to the original study and validity as research that, "closely reflects the world being described" (1995, 85). Lincoln and Guba (1985) propose that research that is dependable, transferable, credible, and confirmable is a more appropriate measurement of a rigorous, qualitative study. I implemented the following procedures in order to gather and analyze reliable and valid data.

I kept thorough records of my research procedures to validate and add creditability to my study (Taft, in Husen and Postlthwaite, 1985). The reliability of my results and accuracy of subsequent interpretations is improved by documenting my methods and including copies of my interview guide, informed consent, and participant information sheets. I explicated the steps taken during this study including, gaining entry into the community, trust and ethics issues, data collection, and analysis methods for reference by future investigations (Marshall and Rossman, 1995). As a result, readers are privy to the process on which I based my conclusions, as are any researchers who may be interested in replicating the study. I implemented the same process before each interview. The same questions were asked in the same sequence to all participants, although some respondents chose to focus on certain questions. All interviews were transcribed and reviewed for accuracy. I included a sampling of quotes in my results chapter to show the origins of my conclusions. Such a series of "checks" is important for the validation of qualitative research and subsequent presentation of results and interpretations (Neuman, 1991).

Ultimately, the rigour of this study depends on the quality of data collection and interpretation of the data. I believe my familiarity with the issues around the HLWBRP prior to data collection, my consistent interview approach, and my careful construction of the semi-structured questionnaire yielded excellent data. I interpreted this data with care, illustrating each theme with representative quotes. The trustworthiness of the data is at the crux of good qualitative research. While another qualitative researcher would be likely to find similar results, qualitative research does not promise 'repeatability' as do hypothesis-testing studies, especially in exploratory studies. Such repeatability is unlikely given the variation in the level of personal

investment and skill required by the individual researcher, the creativity and the background knowledge that goes into the data interpretation process, and the time and context-sensitive nature of some of the issues related in the interviews. Toma (2000) emphasizes that a strong link between the researcher and study participants benefits qualitative research in that the researcher's personal involvement provides depth (meanings to real people) and breadth (a sense of context) to the data. My goal has been to yield trustworthy data on the basis of rigorous data collection and as much as possible, transparency of my data interpretation process. Through peer review from my supervisory committee and 'member checks' from presentations to the community, I am confident my analysis reflects the range of community perceptions of the HLWBRP.

My greatest strength in this study was the trust that I established with community members from my prior summer exposure and good relationships with residents. My earlier time and experience in the community allowed me to easily gain acceptance from community members, permitting me to conduct confident and conscientious research. I was also familiar with the Hook Lake Wood Bison Recovery Project since I had spent two summers volunteering with the project before data collection.

Although I do not have extensive training in the social sciences, I have consulted with people familiar with qualitative research techniques and research conducted within Native communities throughout the project design, fieldwork, and analysis stages of my research. Prior to the initiation of fieldwork I also pre-tested my interview questions with a community liaison and received guidance from my liaison and translator regarding appropriate interview protocol.

I had limited time to carry out interviews and my interviews with elders had to be completed while my translator was in town. Since over half of my study was self-funded travel time and costs as well as other expenses, such as translation and equipment may be a limiting factor in other similar studies. The time I had previously spent in the community helped me gain access to community members, heightened my familiarity with residents and local issues, and increased my confidence in the study results.

I attempted to avoid bias by interviewing a variety of people, male and female, of varying ages and occupations, as well as people who held a range of opinions about the recovery project. One limitation to this type of research is that key respondents could be inadvertently missed. To avoid this, sampling occurred until major themes were repeated (Krogman, 1996). Qualitative research and the use of semi-structured interviews allowed for flexibility to follow up on new themes introduced by participants.

Qualitative research yields descriptive results that are rich in context and social meaning. Key themes generated through the interview and data analysis processes are explored in Chapter 5.

Chapter 5: Study Results

5.0 Introduction

My research explored the cultural consistency of the Hook Lake Wood Bison Recovery Project as perceived by the residents of Fort Resolution, Northwest Territories. I based this assessment on 30 in-depth, semi-structured interviews, participant and non-participant observation, and a review of relevant literature. This chapter describes the views and opinions held by community members of Fort Resolution regarding the Hook Lake Wood Bison Recovery Project (HLWBRP, the recovery project) and community priorities for the future management of this herd.

Several recurring themes that I coded in my analysis reflect common threads of meaning shared by participants. Integral to views expressed by participants was their belief of the proper relationship between humans and bison. The aetiology or cause of disease is reflected in each participant's view of a natural cycle of life[30] and the appropriate or inappropriate role of humans in, or with, their environment. The importance of appropriate relationships among the stakeholders of the bison project, knowledge sharing, and communication were reflected in all of the interviews.

5.1 Knowledge of recovery project

My most surprising recurring observation during my interviews was the lack of knowledge about the recovery project. Over half of the participants across age and gender classes had little or no knowledge of the purpose or goals of the recovery project while less than a quarter of the participants expressed comprehensive knowledge of the recovery project. The remainder expressed uncertainty about commenting about the recovery project. I observed this relatively high level of confusion regarding the presence of the bison project in town during my initial participant observation, interviews, and while I was continuing to live in and interact with the community. The majority of respondents who were unfamiliar with the

[30] According to respondents, a natural cycle of life refers to the inter-connectedness of biotic (i.e., animals, plants) and abiotic (i.e., weather) elements on the land or 'bush.' Participants stated that humans are seen as playing a part in this cycle of life and that only the Creator can control ecological processes and know the thoughts and feelings of all animals.

recovery project were also not involved with the project (i.e., those who did not attend community meetings or those who rarely visited the recovery project facility).

> Interview #12 Isn't a huge amount of money being spent on bison by the government? Why are the little bison living here? For what reason were they gathered up and brought here?
>
> Interview #11: We're not supposed to go up there [to the recovery facility], I don't know [why]...
>
> Interview #5: The government is spending quite a bit on them [bison in recovery project]. Why are they being kept? Why they keep it [the] buffalo here. It's just about five years now...Government, he [the government] spend money for nothing...Nobody kill him [the bison- for food].

The above quotations express participants' uncertainty regarding the purpose and goals of the recovery project. In a few of the interviews, respondents expressed concern that the recovery project animals were handled and kept captive but not "killed for food," a respectful and acceptable practice. This reflects participants' perceptions of the appropriate relationships between humans and wildlife (see sections 3.3.1, 5.2.2). A few participants who were involved with the recovery project stated that they did not know much about the purpose or goals of the recovery project and, furthermore, they said that they did not think disease was a big problem for the wild or captive bison herds.

The clarity and quantity of communication between recovery project partners (e.g., community residents, project staff) appears to affect the interviewees' certainty of their responses. For example, a few participants who had been involved to some degree with the project were better able to express specific comments about the purpose and goals of the recovery project. Further, the majority of all participants either stated that they were unsure about who was in charge of the project or that they thought that the entire project was controlled by the Band or the Territorial or Federal Governments.

Approximately half of the respondents, both male and female, expressed confusion regarding the difference between the Hook Lake Wood Bison Recovery Project, situated at the east end of the community, and the Edjericon Ranch, a commercial bison ranch located on the highway approximately twenty kilometres away from the community.[31]

> Interview #22: I don't know why they bring them here [bison in both projects]...Just for people to make money on or [be]cause [there are] hardly any jobs around here. That's all their [they are] doing that for? I don't know.

Since the completion of my fieldwork, the Band sold the commercial herd to an Alberta bison rancher. The removal of this herd may help to clear up some confusion between the two captive bison herds, however, my results show that residents were uninformed and confused about the purpose of both bison herds.

One male participant who had been involved with the recovery project hypothesized that other community members were concerned about the anthrax outbreaks of the 1960s since vast numbers of bison died in a short period of time and that residents may equate this incident with the current management of wildlife species. According to Wobeser (1992), about 1100 animals died from anthrax and over 600 bison died as a result of injuries during the anthrax vaccination round ups of 1965-1977 (see Chapter 2). This respondent further stated that bovine tuberculosis and brucellosis had existed at low levels for such a long period of time that residents "haven't paid much attention" to that disease issue (Interview #1). Respondents described seeing healthy animals chased by helicopters and people during the winter months. They reported that the animals would foam or froth at the mouth, appear to have severely laboured breathing, and that as a result, many bison collapsed, were trampled, aborted calves, or died from other injuries.

---

[31] Both projects are regulated through the Band Council for two distinctive purposes. The Edjericon Ranch was designed as purely economical to generate revenue for the community while the recovery project was designed to establish a disease-free herd of wild wood bison and return them to an enhanced ecosystem.

> Interview #4: [I have] Seen that helicopter - they [biologists] chase buffalo around too much— [the biologists] gave [the bison] needles. [The biologists] shouldn't chase [the bison] at all- even young ones get played out-buffalo all puffed out... [In the] Seventies [1970s] around there. I seen a buffalo there, in corral, then into squeeze—seen blood from mouth, after being chased.

The majority of participants who attested that diseases in bison were caused by excessive handling or stress on the animal were primarily male elders or hunters. These respondents described that undue stress could be caused by bison capture methods (i.e., being chased by helicopters, tranquilized) and referred to the anthrax outbreaks in the WBNP area during the 1960s and 1970s. Most of these participants did not make a distinction between anthrax, tuberculosis, or brucellosis.

5.2 Perceptions of the recovery project

Those participants aware of the project included men and women who expressed a spectrum of opinions regarding the need and future success of the recovery project. Each participant's perceived relationship with the environment and wildlife appeared to influence their opinions of the recovery project. Although respondents held a variety of opinions about the recovery project, all were receptive to discussing their thoughts and, for the most part, were eager to learn more about the recovery project.

Approximately half of the participants, the majority of whom were men, stated that the recovery project was good or 'okay,' and the other half was divided between those who stated that they were not in favor of the recovery project and those who said that they were unsure. Half of the female and male elders interviewed were not in favor of the recovery project, often stating that it was inappropriate to place bison in captivity. A couple of elders stated that they were unsure about how they felt about the recovery project, but that they were not comfortable with keeping the female bison in small pens while they calved. The remaining elders felt that the project was acceptable, but they raised concerns about the animals being fed and becoming too lazy. For example, one elder said that the bison were not getting enough exercise and that they were too accustomed to being fed by humans (Interview #5). Generally, the respondents who were in favor of the recovery project also believed

that disease was a problem, although most of these people said that disease was a result of improper handling methods or were unsure of the cause of diseases in bison. Female and male residents more actively involved with the project had a greater knowledge of the project and generally a more favourable outlook on its success. For example, one participant specifically stated that she was happy that some local youths and adults were included to assist with the care of newborn calves at the facility and with government biologists (Interview #2). She affirmed that it was important for government personnel and community members to learn from each other.

5.2.1 Perceptions of the habitat enhancement phase

More than half of the participants spoke about the prescribed burning phase of the recovery project. The majority of those who did not wish to talk about habitat enhancement either said that they were more concerned about the bison or stated that they were unsure why project staff were setting fires in the prairies. Those who were in favour of the recovery project tended also to be in favour of prescribed burning of the Hook Lake prairie areas. The majority of those in favour of habitat enhancement were male respondents; practically all of the male elders were in favour of prescribed burning.

> Interview #1: So right now it's [Hook Lake area] at a stage where it's going to evolve into a big willow community. One of the ways to stop that encroachment was to prescribe burning...The old timers used to do that [prescribed burning] all the time. This time of year- springtime. They knew, eh- like they knew that the land is dependent on fire.

A few male participants stated that prescribed burning and fire played an important role in the ecosystem and maintained grassland areas for bison. One respondent explained that prescribed burning was required since there were too few bison in the Hook Lake area to prevent the encroachment of shrubs through grazing pressures (Interview #24). While those in favour of burning prairie areas were divided about whether spring or late summer was the best time of year to burn, all agreed that the prescribed burning resulted in high quality grass that was healthy and 'good for' bison and other wildlife.

5.2.2 Relationship between humans and bison

The people of Fort Resolution have their roots in hunting and gathering from their local environment (Mandeville, 1998; Smith, 1982; Smith, 1978). Most residents continue to practice these traditional activities on a part time basis (Mandeville, personal communication, 2001; see Chapter 2). As such, they have developed a functional and spiritual relationship with wildlife that influences their daily actions and viewpoints. Several participants, primarily male hunters, said that there are certain rules regarding proper conduct to which they adhere when they interact with bison and other wildlife hunted for food. As part of showing the proper respect to the hunted, a few respondents explained that the hunter should only take (i.e., kill) enough for subsistence and not waste meat.

> Interview #15: When you are tracking bison, you often come across them in a huge prairie where they are standing, then you simply kill them. You don't overkill them. You kill what you need. Maybe three. It takes a lot of work to butcher them as they are big.

Historically, entire families would participate in the hunt, but with the movement towards a more sedentary lifestyle and schooling, many women and children remained in the community (Smith, 1982). The majority of women that I interviewed and spoke with casually stated that they would not usually participate in the tracking and killing components of the hunt, but would prepare the meat that was brought to them by hunters. According to several participants, hunting often occurs in small groups and hunters share the responsibilities and products of the hunt (the kill, butchering, transportation, packaging, and meat preparation). More specifically, one male participant described the unwritten rule that others who assist a hunter should receive an equal share in the meat hunted.

> Interview #14: Four or five years ago was the last time [I hunted bison]. There were four bison but I killed one...[two people] came up to me, helped me butcher the bison, so I gave them half. It [is a] tradition that when someone helps another butcher an animal in the wild, half the animal is given to them.

Many respondents, women and men of various ages, suggested that humans and wildlife are connected with each other, playing complementary roles in nature. One male elder expressed the views of several participants when he gave a detailed explanation of the traditional belief that humans are part of nature. Further, he stated that all creatures are equal and should be treated accordingly with respect. He implied that humans, 'domestic' animals (i.e., sled dogs), and wildlife should all be treated alike. He further stated that wild and domestic animals and humans can work together during a hunt if the animals are treated with proper care and respect. If animals are treated poorly or without the proper respect then there could be negative consequences for the perpetrator. For example, one elder shared the belief that if a hunter tricks or injures an animal because he thinks it is interfering with the hunt, and the animal was not involved, then the injured animal or one of its species may damage the hunter's cabin or bring bad luck to future hunts.

> Interview #3: Wolverines and dogs [are] like humans. Do not shoot wolves for they aid in the hunt ... And, if you trick an animal or shoot for no reason, for example, [the harassed animal] bear, will [consequently] return to destroy the cabin. Same with ravens [who are eating the rabbit you snared]. If you shoot them, [and] shoot the wrong one [that didn't eat your rabbit], rabbits [your kill in the future] will always be taken [eaten] by ravens.

During several interviews, participants compared the treatment of animals, such as bison, by humans to the treatment of humans by government agencies or other people.

> Interview #9: How would anybody like it. The [government] take your kids away from you. Chase you all over the damn country then take your kids away. That's not right, they should have left them [the bison calves] where they belong... out in the wild the mother trains them [bison calves].

The amount of contact that recovery project staff have with the bison is of concern to many within the community, including both male and female participants. The management of the bison at the recovery project facility has involved daily handling of bison during the calf-capture phase and during disease testing procedures (see Chapter 2). Some respondents view this level of handling as unacceptable and improper treatment. Among those who prefer less human contact with captive wildlife, some noted that bison are wild animals and, like themselves, learn life skills

from growing up on the land and from their female parent. A few participants, in particular, women and male hunters spoke at great length that the role of the family unit is important for the proper health and functioning of human and wildlife groups. They explained that, like humans, immature animals learn survival skills from others in their family unit. Bison calves were said to learn what grasses were good to eat and how to react to predators from their mothers (Interview #8). A few of these male participants stated that the bison brought to the recovery facility as calves have not learned the necessary survival skills to survive by themselves in the wild.

> Interview #12: Were they to be brought back, how would they eat? In the winter, they probably would freeze because they don't know how to feed themselves. They wait to be fed. In the winter, bison use their head to dig the snow away so they can feed. Those bison here probably don't know how to do that. They are not growing up on the land. They were taken away from their mothers.

In a traditional lifestyle, the only physical contact (i.e., handling) Native people had with bison and other wildlife occurred during the hunt (Interview #2). A few respondents, primarily elders, suggested that to take bison out of their natural surroundings for purposes other than sustenance, and handled on a daily basis, shows a lack of respect for the animal. For the majority of participants with this opinion, they recommended a limited interaction between humans and bison at the facility. This recommendation calls for a decrease in the handling of the bison and an increase in the fenced area. One male participant who had some involvement with the recovery project and who was familiar with its goals, thought that the project was relevant to disease control in bison populations, but that there was still too much human handling (Interview #26).

Other key respondents who were knowledgeable about the project and were, for the most part, male participants, viewed the intensive management system as acceptable. These respondents made statements that the bison had "taken care of" their people for so long that it was now their turn to "take care of" the bison (i.e., Interview #13, 23, 29). All of these respondents had been partly involved with the recovery project and appeared to be relatively well informed about the goals and objectives of the recovery project.

> Interview #29: This project is special because it gives the animals a chance. To me as a native person I was taught to protect the land, to protect the animals. Protect the Earth and that's what we are doing. There's nothing wrong with that. Some elders say it's wrong. Let mother nature look after them, but sometimes there's so much damage done to mother nature already that sometimes she needs a little help and this is one way to do it.

> Interview #2: You are supposed to be very respectful of animals and you're supposed to leave them within their environment. So what's happening here is that you're taking these animals out of their environment and then [in] the traditional sense, it's not very good. ...[but] the bottom line is at this stage we have no choice so we have to do something that we traditionally wouldn't do. We better do it with a lot of respect.

5.2.3 Perceptions of Disease

Respondents' perceptions of disease, what constitutes a disease, and whether bovine tuberculosis and brucellosis are a problem for wood bison, are issues at the heart of the northern disease bison issue. In almost a quarter of my interviews the respondents refrained from making strong statements about the disease issue. Instead, they redirected the conversation lines to relate a personal story or discuss another topic. "People in Native societies, in contrast [to European cultures], are careful in making assumptions, and offer information only when it is personally known to the individual" (Hoare *et al.*, 1993, 49).

> Interview #25: I don't think it's [diseases in bison] a BIG (stressed word) problem right now. (pause) But, ahh, I don't know for sure, okay?...ohh, I don't even know how they got it for starters. I think some of these diseases just lay dormant.

Opinions regarding disease varied amongst participants. Some female and male participants did not believe that bison were infected with bovine tuberculosis or brucellosis. A few of these participants felt that the government was lying to community members about diseased bison (Interview #17). They defended their allegations by stating that they had not seen anything out of the ordinary (diseased) about wild bison. Further, these respondents held that disease is a part of nature, and that all animals have some type of disease throughout their lifetime.

> Interview #13: There's going to be certain diseases that are going to affect these animals because it's just nature playing its role. People are going to have to understand where we are going to intervene to try to change the natural cycle of things. So it's a balance we have to find to assure things that we have to do help and I think that there's certain things as humans we are just going to have to say well that's nature taking care of itself and we have to leave it as it is.

Other participants, including a few men who were familiar with the recovery project, said that they thought diseases such as bovine tuberculosis and brucellosis were in bison populations, but that the disease problem was not a big problem, and that the incidence of disease had been exaggerated by government officials.

A few male and female elders asserted that there was no disease problem, or that only older animals become ill. One male elder stated when an older bison becomes ill then it will leave the rest of the herd (Interview #18). The majority of elders reported that disease was an issue, although they attributed the increase in diseased animals to government intervention and handling of wildlife. All elders held that disease was a natural part of the lifecycle for humans as well as for bison.

Parallels are made between humans and animals throughout discussions of bison. Comparisons were made by female and male residents across different generations that link the treatment of wildlife and the treatment of humans, reinforcing a larger more holistic belief that all living things are a part of nature.

> Interview #23: What if it was reverted? What if it was the buffalo's world ...and they were talking about killing us off because we were sick. When someone in the community has TB or AIDS or cancer...and there seems to be more than one person that has it, do we kill off the whole village, or do we kill off the whole community, or do we look and pray for a cure...They [the bison] don't have a voice within our society, but they are their own nation.

5.2.3.1 Aetiology of disease

The majority of respondents who described what to look for in a diseased animal were men. The women I interviewed stated that they would remain at home or in camp and that the hunters would only bring back healthy meat. Many participants hypothesize that the appearance of disease in bison correlates with an increase in intensity of wildlife management. These respondents stated that illness in bison is caused by inappropriate management techniques, by excessive handling of animals, especially in cases where bison have been chased by helicopters and the stress that it places on the animals' systems (described as capture myopathy in wildlife biology). Another participant stated that she thought brucellosis might be transmitted by mosquitoes and that the spread of tuberculosis was similar to that of AIDS.

> Interview #7: We heard that hunting bison might be prohibited because their populations were dwindling. That was when they started tranquilizing them. So it's the government's fault that they got sick. They banned hunting so they could tranquilize them to prevent them from getting diseased. None of them were diseased before then. I saw one with a badly infected hindquarter. They looked very pitiful.

A few other participants, usually male elders, reported that specific human handling and tranquilizing methods caused the bison to become ill and, in some cases, contract tuberculosis (TB).

> Interview #5: There was a lot of them [bison] so I hunted them. After that, they were being chased by planes so they got TB [tuberculosis] from sweating. And then after that, they [biologists] were tranquilizing them, chasing them [bison] with helicopters, in the cold. They [the bison] would sweat, catch a cold, then get TB.

Only a very few respondents acknowledged or legitimized the scientific causes of and methods for determining disease in bison presented by biologists and veterinarians. The majority of these participants were men of various ages who held different amounts of knowledge about, or participation rates with the recovery project.

> Interview #1: I think it came from the plains bison back in 1926 when they mixed up the herd between the plains and wood bison in the southern park, in the Athabasca area. From there we got the hybrid and the disease came this way, but ahhh we found over the years that there are certain pockets like the Nyarling herd that was disease-free eh? (long pause) for the longest time.

> Interview #3: Well, they give a needle or they take a blood sample. If it's a blood sample then it's negative, positive, or something then they have disease, they know that by that.

The majority of respondents who described what to look for in a diseased animal were men. Female participants who spoke of meat preparation said that they would examine the meat for any abnormalities such as lumps and swollen joints (Interview #7, 16). Male participants who described the hunting process explained that a hunter should check the internal organs and examine the general appearance of a killed animal.

> Interview #18: Also, if [I] kill a bison, I check it. A sick one may have a white liver, maybe frothy lungs. Those bison are burned and buried.

Hunters explained that they also check for any irregularities in organs or muscle tissue, such as lumps, discolouration, or pus-filled sacs. Several hunters described the procedures that they would take if they found a diseased animal. Some of these respondents stated that they would either bury or burn the carcass or leave it for scavengers to 'take care of.' About half of the hunters stated that one should report the diseased animals to the local Renewable Resources Officer.

An additional concern raised by some male hunter respondents was that measures used to control one species could have a wider effect on other animals. For example, a couple of participants said that one reason the bison were getting sick was a result of the animals eating poison or grass near the poison placed on the prairie to control wolf populations in the 1960s (Interview #8, 18).

5.2.3.2 Treatment necessary for diseased bison?

This section of results is directly related to whether participants viewed disease as an issue or a problem in bison populations (see 5.2.3). Participants' perceptions of disease as an issue or a problem in bison populations appeared to influence their views on whether bison needed to be treated (i.e., with antibiotics and testing methods) for bovine tuberculosis or brucellosis. Those participants who did not perceive a disease problem in bison or who described disease as a normal part of life cycles in nature held that bison populations should be left alone and that no treatment was necessary.

> Interview #27: There have been changes, I guess in the last twenty years- the [bison population] numbers here. I think their, the level ahh population is at a level where it's probably where going to be all the time. I don't know what the word is for that [carrying capacity].

Several respondents, especially female and male elders, explained that disease is part of the natural lifecycle and that animals in the wild can cure themselves of any harmful diseases by eating certain plants. They further theorized that without being able to access wild plants, captive bison might not be able to cure themselves of disease.

> Interview #3: Some of them get cured by themselves, the wild animals- eat a certain kind of grass or something. Just like humans, I guess. Some people get sick, can't eat, and die.
> All [living things are] the same.

> Interview #8: Same thing with humans, feed food we don't want to eat, we'll get sick too. Same as buffalo. Buffalo don't know what they eat [at facility in town]- they eat lots of things [in the wild]. They eat spruce bough for their digestion, willows, everything- they don't eat that here, all they eat is barley and hay an' that's it- nothing fresh for them- so how are they going to be healthy?

A few other participants stated that the treatment of the bison at the recovery project was necessary to achieve a disease-free herd and was a way of taking care of the bison who had previously taken care of Native people (i.e., Interview #29). Yet others were concerned about the prevalence of disease in wild bison and stated that the treatment of the bison at the recovery project was necessary to achieve a disease-free herd (i.e., Interview #1, 13, 23, 29).

5.3 Future of the recovery project

Of those participants familiar with the project, I discovered a spectrum of opinion regarding the need and future success of the recovery project. When asked about the future of the recovery project, interview responses were varied. They ranged from keeping the animals in town to use and sell the meat to community members, to sell bison and meat to raise money for the community, or to release other animals back to the wild. The release option was met with three primary reactions. One reaction was that the bison would not be able to survive and would perish. Secondly, participants suggested that the bison would slowly learn to re-adapt to the wild with a slow-release method. The 'slow-release' method described by participants included fencing an area of prairie to protect bison from wolves to allow them protection in an area to learn how to eat native grasses. The third response to release, primarily expressed by female participants, was that the bison would quickly overcome any habituation acquired in the facility due to their innate sense of wildness.

Over half of the participants, including women of a variety of ages and men younger than 60 years old, said that the recovery project animals should be returned to the wild. All of these female respondents said that they thought bison had an intrinsic knowledge of living in the wild or that they would easily adapt to the wild.

> Interview #23: I think they will have a really good chance from [what happened with] the bison who have been released from the MacKenzie Bison Sanctuary, [they] have really flourished and really been successful. I don't see why ours can't. It would be the same... I think it's instinctive I guess and innate – it's in their genes [to re-adapt to being wild animals]. They have that wild spirit [their wildness]. Shows them where the shrubs are.

A few participants spoke of the Creator as having control over the environment as well as control over populations of humans and wildlife. Both male and female respondents held these views, although all had experienced a traditional lifestyle during their youth (e.g., learning on the land from parents and elders).

> Interview #20: If they [the bison] were brought back to the wild, they would want to eat...Those ones in town eat by being fed. I don't like them [being kept captive]. They can take care of themselves. That is how they become adept and wise in the wild. They were meant to be independent. That is why they were placed here by the Creator. We don't know how they feel. Whether it's good for them or not [to be kept in a facility]. Today, everything is changing.

One concern raised by many male participants was that, as a result of bison contact with dogs at the recovery facility, the bison at the recovery project would not be scared of wolves once released in the wild. These participants related that the bison at the facility had become too tame and accustomed to contact with humans. The bison would customarily travel to the feeders when project employees added hay or grain. A couple of participants, male hunters, addressed this concern by suggesting that bison returned to the land should be temporarily fenced in, slowly weaned off of their feed, and protected from predators.

> Interview #3: Yeah, in a way it's good. But then, if they build that fence, to protect from wolves for two or three years they give them a chance to learn by themselves, then let them go in the wild- right now, you bring them back in an open place, they won't be scared...so tame, somebody walking there, they'll think he's going to feed them.

Some male elder participants thought that the bison should be kept at a facility in town while only a few participants said that they were unsure about what should be done with the bison and said that they did not have enough information to comment. One respondent said that the bison should not have been captured and brought into town, that they should not be kept in town, but sold off (because the bison were not useful as captive animals).

5.3.1 Perceived economic development options

Approximately a third of all respondents were in favor of a variety of commercialization options as part of future options. Several male and female participants said that bison should not be sold, but should be used to provide meat for the community, consistent with previous practices of community freezers, where wild meat was made available for those in need and for elders. The majority of these respondents suggested that trophy or big game hunting be implemented after the bison were released to the wild as a means of generating income for the community. These people also said that community hunts were also important to maintain and that the meat from money-generating hunts (i.e., trophy and big game hunts) should also be given to the community. A few female and male elder respondents expressed dissatisfaction about the amount of money likely spent on the recovery project. They suggested that some of the project funds should be spent on addressing other issues perceived to be more important, such as the garbage problem in Fort Resolution, the maintenance of the graveyard, and improving recreational sites. Although one elder assumed that the band provided all the funding for the recovery project,[32] he stated that community improvement lacked funding and should be a priority (Interview #12).

One female participant who was very familiar with the recovery project stated that selling bison meat or hides as a future side-operation would be an acceptable means of raising money for the community, but she emphasized that the spiritual nature of Native peoples' connection with the bison should be maintained. For example, this respondent mentioned that younger generations as well as those people working with the animals should be taught to respect historical traditions of handling bison, the privilege of being in physical contact with the bison, and to leave the bison alone whenever possible.

---

[32] Funding for the recovery project is currently provided by the Government of the Northwest Territories. Administrative in-kind support for the project is provided by the Band (see Chapter 2).

Another participant stated that in addition to bison ranching the community could implement an eco-tourism program as another way of generating revenue for the community and improving public knowledge of the northern bison (Interview #26). A few male and female participants said that the local education institutions such as the Deninoo School and Arctic College should incorporate the recovery project into cultural and biological courses for all students. It was their opinion that this option could increase community understanding of and involvement with the project as well as provide an opportunity to learn traditional values.

5.4 Perceived relationships between managers of the recovery project and community members

The majority of participants perceived several levels of stakeholders or interested parties. Several participants, of all ages and levels of involvement with the recovery project, alluded to the 'insiders' as residents within the community and the 'outsiders' as those involved with the project who periodically come into the community. This latter group consists primarily of territorial government employees, including a wildlife biologist, a wildlife technician, and a wildlife veterinarian. These individuals co-ordinate their activity in the community with key management periods for the bison herd (calving in May-August, disease testing in November, and disease testing and pregnancy checking in February). During spring and summer months, there have also been university students from Canada and the United States who have volunteered for the project. The students generally have a high turnover rate, with the majority of them spending two to five weeks in the community and not returning in subsequent years.

Within the community of Fort Resolution there are other distinctive groups, such as residents who are part of the DKFN and those belonging to the Métis Nation. These groups have separate governing bodies but both are represented within the Aboriginal Wildlife Harvesters Committee, which, in co-ordination with the DKFN, is responsible for fund allocation and some decision-making for the recovery project. Renewable Resources staff in the community consists of a Renewable Resources Officer and during summer months a fire crew. These residents have been involved with the recovery project's habitat enhancement phase (see Chapter 2). Additionally, the fire crews assisted with the construction of the buildings and fences at the recovery facility. During the calf capture phase of the project, students from the community were hired by the Band to assist with calf rearing and treatment during spring and summer months. Respondents more actively involved with the project have, as expected, a greater knowledge of the project and generally a more favorable outlook on the success of the recovery project.

5. 5 Communication

Many participants, across all ages and including those who were actively involved with the recovery project, perceived a lack of communication between recovery project managers and community members as a contributing factor affecting participants' knowledge of the project. Several male and female elders mentioned that language and terminology affected communication. For example, the majority of elders I interviewed preferred to attend meetings where Chipewyan was spoken (or translated from English). Additionally, several female and male participants stated that they 'had not heard of' presentations to the community by recovery project managers or that they did not like going to the Band Office to attend meetings because they felt uncomfortable with those in current positions of political power. One participant explained that she avoided the Band Office stating that she felt uncomfortable interacting with the staff. I observed a split in community opinion regarding those in political power, which appeared to correspond to membership in one of two main families. Those who favoured the families in political power were more likely to spend time at the Band Office and attend local meetings. A few participants strongly emphasized the need for improved communication between project managers and residents, as well as for community members and all of those

involved with the recovery project to 'work together'. One participant, who had been actively involved with the recovery project, specifically stated that the community itself needed to become more actively involved with the project as it was good publicity for the community (Interview #27).

Language is another factor affecting the communication between stakeholders, especially between the government representatives involved with daily management of the recovery project and community members not actively involved in the recovery project. Some male and female respondents, especially elders, reported difficulty with technical words used by outside representatives, during the 1990 panel hearings on the disease bison issue and during recent recovery project meetings.

> Interview #22: I never go to meetings. They say such big words and you know, I wouldn't understand what they're saying. That's why my daughter... She goes to meetings like that. I don't know it's big words. I don't bother.

During several informal conversations, I noted that community members expressed apprehension about the location of and tools used at recovery project presentations. These presentations were carried out by GNWT recovery project staff at the Band conference chambers where overhead projectors and, more recently, power point presentations were used to convey project updates to those in attendance. Many respondents and other community members expressed discomfort with the "movie theatre" setting used for presentations. Audience chairs in the Band office are fixed to the floor while presenters stand at the front, often with equipment (i.e., projectors, laptops, and cords) creating a greater physical separation between 'presenter' and 'observer.' This distance appears to discourage audience participation and increases feelings of "us and them" between GNWT personnel and community members. Furthermore, the use of technology is unfamiliar to the majority of residents and seems to create a larger gap between those coming into the community to present and the residents affected by the project. One participant stated that he was happy with informal meetings he had attended regarding the project (Interview #3). He appreciated that recovery project staff showed maps of prescribed burn areas to the elders, and that the staff asked for his opinions about the success of the recovery of prairie rangeland through the use of fire.

Five themes were identified from the interviews and informal conversations with community members. They included, knowledge of the recovery project, perceptions of recovery project, priorities for the future of the recovery project, perceived relationships between managers and community members, and communication between recovery project staff and residents. In Chapter 6, I continue to explore these themes by relating them to the theoretical background and relating the significance of my findings for the community, the recovery project, and the northern diseased bison issue.

Chapter 6: Discussion and Conclusions

6.0 Introduction

Every story has more than one interpretation and the northern diseased bison issue is no exception. In this study, I describe the views and opinions held by community members of Fort Resolution regarding the Hook Lake Wood Bison Recovery Project and their priorities for future management of this herd. I reviewed relevant literature, participated in community life in Fort Resolution, and interviewed community members about their perceptions of the recovery project as well as future priorities and options for the captive and nearby wild wood bison herds. This thesis reports individual perceptions of the recovery project including residents' priorities for the current and future care of the bison and impacts of the program on the community.

Key themes recurrent throughout the interviews were a value for shared respect for the environment, maintaining an essential wildness of wildlife, understanding disease as a natural process, and minimizing handling of bison because it is viewed as an unnatural process. Respondents' perceptions of the HLWBRP appeared to be based upon these concepts as well as their knowledge of the recovery project.

There are many stakeholders both within the specific Hook Lake Wood Bison Recovery Project and the Northern Diseased Wood Bison Issue as a whole. While this project focused on the concerns expressed by residents of Fort Resolution, it is important to note that in other neighbouring communities (e.g., Fort Smith, Hay River), environmental and bison conservation groups, cattle and bison ranchers, wild bison managers, and provincial and federal government representatives have participated in the northern bison disease issue. The FEARO panel recommended the acceptance of Option 4; that the WBNP and nearby herds be depopulated and replaced with disease free bison. Outcry against the proposed slaughter of these bison by environmentalists, Aboriginal communities, and other groups resulted in a call for further research and study (see Chapter 2). This study is important since it includes an exploration of Aboriginal views of the HLWBRP and the northern disease bison issue, thus informing the current debate.

6.1 Hook Lake Wood Bison Recovery Project and co-management, how well is the project working?

The Hook Lake Wood Bison Recovery Project was initiated in response to the northern diseased bison issue. In the past, limited scientific and historical knowledge was available due to the relative isolation of the wood bison herds and the low population numbers (Foster, *et al.*, 1992). In the original 1991 management plan for the HLWBRP the Deninoo Wildlife and Resources Committee projected that the five goals of the recovery project would be achieved after ten years (Deninoo Wildlife and Resources Committee, 1991).

Original Goals of the Hook Lake Wood Bison Management Plan

1. To restore a healthy herd of wood bison to the Hook Lake area.
2. To preserve the genetic integrity of the Hook Lake Wood Bison.
3. To salvage the existing healthy bison from the Hook Lake area.
4. To preserve and enhance the Hook Lake ecosystem.
5. To explore and recognize the potential commercial opportunities for the Hook Lake wood bison herd.

(Deninoo Wildlife and Resources Committee, 1991, 2).

This plan estimated that ten years would be required to complete the above goals. Challenges have delayed the attainment of some of these goals. Technical uncertainty is a key factor influencing federal efforts to establish a disease-free herd. To achieve disease-free status, each of the female founder animals (wild-caught as calves) and their first calf must test negative for brucellosis after calving (Nishi *et al.*, 2000). Any decision to award disease free status to the herd will involve the Canadian Food Inspection Agency (CFIA) and the National Wood Bison Recovery Team (Nishi *et al.*, 2000), although the exact criteria have not yet been established. The HLWBRP has accomplished Goal #2 by using a sufficiently large wood bison founder herd; this has resulted in the greatest diversity of wood bison genetics acquired from the WBNP area (Wilson, 2001). From 1996-1998, sixty-two newborn calves were captured from the HL area, kept in isolated pairs for a year, treated with antibiotics, and tested for TB and Brucellosis. Fifty-eight bison now make up the founding herd and to date an additional 50 calves have been born and survived at the facility (see Chapter 2, Table 2). The most recent whole herd test was conducted

in March 2002 and thus far all animals have tested negative for bovine tuberculosis and brucellosis (Elkin, personal communication, 2002).

Goal #4 of the management plan addresses the habitat improvement stage of the HLWBRP. This range enhancement phase of the project included prescribed burning of prairie areas in the HL area from 1992 to 1998. Quinlan (1999) compared black and white aerial photos from 1973-1997 of the HL area in addition to field studies in 1998. She determined that, "some of the Hook Lake area meadows have experienced extensive woody plant establishment in recent years and that spring-lit fires alone may not be effective at maintaining the high quality, meadow habitat preferred by bison" (Quinlan, 1999, 101). Although repeated burning of HL meadows resulted in decreased willow shrub vigour, forages less palatable to bison appeared more prevalent than in unburned areas (Quinlan, 1999).

The development of commercial opportunities is a goal of the project that has not yet been explored. This goal depends on the herd acquiring disease-free status and the demand for bison products for local or export markets. There is a section in the 1991 plan devoted to "Community Meat" where inspected meat from animals slaughtered would be distributed within the community. The plan described that following a test and slaughter program of the HL bison, all positive reactors and mature male bison will be slaughtered for distribution of meat in the community. A wild herd of bison remain in the HL area and residents are still opposed to the depopulation of this herd. The plan also notes that recovery project animals will be killed every fall to provide meat for the community (i.e., male calves raised but not kept for future breeding purposes). This option has not yet been initiated. Some meat from bison mortalities at the facility has been provided to the community; however, a couple of participants stated that they preferred the taste of wild meat over the grain and grass-fed bison and one male hunter said that he fed the meat to his dogs instead of his family.

The 1991 management plan provides an overview of the location and methods to be used for the capture and habitat restoration phases of the HLWBRP. Initially, the project facilities were to be established at North Prairie in the HL area (Deninoo Wildlife and Resources Committee, 1991). Logistical and practical constraints such

as, the cost of equipment (i.e., electrical generators) and the transportation of equipment, feed, and staff to the site resulted in the relocation of the facility into the community of Fort Resolution. These challenges would arise again if a handling facility were relocated to the HL area for a slow-release of project animals.

The need for clearly defined roles of community members as well as project managers[33] may be necessary to move this project into a more co-management-like model. The initial management plan and subsequent progress reports and papers loosely define the roles of the community and government employees (RWED, GNWT personnel). For example, community involvement is described in section 2.5.2 of the 1991 management plan in terms of the importance of bison as a local food source. This section also defined community support for the project as the formal acceptance of the project by the Deninoo Community Council and Deninoo Wildlife and Resources Committee (DWRC). Further, the only specific reference in the management plan to specific roles for maintaining community involvement in the recovery project occurs under section 3.2.6 (Animal Husbandry) where the plan states that one local person will be trained to look after the captive herd (DWRC, 1991).

> It is desirable to establish a training component to enable a local individual to develop skills and knowledge associated with the care and maintenance of captive bison. The Deninoo Buffalo Steering Committee will be responsible for monitoring the training of a local individual (Deninoo Wildlife and Resources Committee, 1991, 20).

A local person has been hired to fill this position; his primary role is the daily care of the bison and facility and he 'checks-in' with project managers to make management decisions. This section also mentions that, "a professional will be retained to monitor and ensure the continued health and proper care of the bison" (Deninoo Wildlife and Resources Committee, 1991, 20). This plan does not make reference to monitoring community participation or community satisfaction with the project.

---

[33] As defined in Chapter 2, project managers refer to those in charge of the day-to-day management of the bison in the recovery project. These people do not reside in the community and are technical specialists, positions that have resulted in their development into *de facto* project decision-makers.

Although the community of Fort Resolution supported the FEARO panel recommendations and the initiation of the recovery project, many residents perceive a difference in control and decision-making power between the government and Aboriginal partners. Several participants said that they thought that the GNWT representatives were in control of the project while a few other participants said that they thought only the Chief and council were in control of the project. This may be explained in part by a lack of community awareness of the history and details of the recovery project. While all respondents had heard of the recovery project, many were unfamiliar with its goals and objectives. Kruse *et al.* (1998) expressed similar findings regarding the Beverly and Qamanirjuaq Caribou Management Board (BQCMB). " The BQCMB meets in a user community at least once a year. What is most striking, perhaps, is that less than half of BQ traditional users know about the BQ board" (Kruse *et al.*, 1998, 451). Participants most familiar with the HLWBRP were people who were in influential positions or had been directly involved with the project. They spoke of the HLWBRP as a 'community-based' recovery project, as opposed to other participants who were less informed and referred to the project as operated by the government or the Band. These findings indicate the need for knowledge to be disseminated equally among residents to better facilitate a sense of shared ownership of the project. Many residents lack familiarity with the HLWBRP and, consequently, may not perceive ownership of or association with the project.

Flexibility of and informal agreements between co-management partners are an important factor for the success of these arrangements (Kendrick, 2000). This type of arrangement may also be described as reciprocal exchange; the interaction between partners occurs in unofficial situations where individual benefits are unknown (Molm *et al.*, 2000). The elasticity that this approach affords is conducive to the development of trust and fosters informal networks of Aboriginal communities. Molm *et al.* (2000) assert that trust is better developed in reciprocal rather than negotiated networks, where binding agreements define partners' roles. My findings agree with this theory to the extent my interviewees prefer casual exchanges regarding the project, but in a context where their involvement is treated as a serious commitment by project leaders. In some cases, interviewees felt their involvement was trivial to the point where it hinders the development and maintenance of resident trust with project managers. Hanyani-Mlambo and Hebinck (1996) recommend that the

informal networks of indigenous cultures should be linked with formal networks associated with government agencies to attain local goals. Osherenko (1988b) suggests that all stakeholders (e.g., user groups) be included in the decision-making process in order to develop a sense of personal responsibility or ownership. Within this context it should be noted the Deninu Kue' First Nation (DKFN) is cited as initiating the HLWBRP by publishing their plan through the DWRC in 1991 (Nishi *et al.*, 2000; DWRC, 1991). Community members wrote this plan and used information provided by the Department of Renewable Resources, GNWT (Unka, personal communication, 2002). In 1995, a revised management plan was developed by the DWRC and the Department of Renewable Resources, based on the original 1991 plan. The recovery project was subsequently initiated in 1996 with joint support from the GNWT (see Chapter 2). From 1996 to 1998, HLWBRP progress reports were compiled by project managers for distribution in the community. These reports provide details about the habitat enhancement, disease testing, and captive breeding phases of the project, however, they do not address community involvement or satisfaction with the recovery project. One of my major recommendations from this study is to encourage project managers to more carefully define community roles and responsibilities, and to develop and plan a monitoring system to encourage informal networks with the community based on a formal commitment to the community to maintain resident involvement.

6.1.1 Context of the HLWBRP within the community

Residents' perceptions of the specific recovery project and the general northern diseased wood bison issue appeared to be shaped in part by the beliefs they held regarding disease, and its role in nature, and perceived appropriate or inappropriate relationships between humans and the environment (and other species). This philosophy emphasizes the interconnectedness of all beings in nature and was expressed by participants of all ages during the interviews. It is also important to note that Indigenous Knowledge refers to all knowledge held by Native people, including present day circumstances and knowledge gained from non-traditional sources (see section 3.2). Resident's perceptions of the recovery project are also related to their interactions with western society, especially government personnel.

The diversity of feelings expressed by participants revealed differences in their perceptions about the consistency of the recovery project with their indigenous knowledge, specifically human-animal relationships. One of the tenets of IK is that humans act respectfully towards all living entities (Berkes, 1999a; Huntington and Fernandez-Gimenez, 1999; Sherry and Vuntut Gwitchin First Nation, 1999; Berkes, 1988; Osherenko, 1988c; Malloch, 1984). Proper interactions with wildlife include appropriate methods of hunting as well as the way a hunter may describe the hunt or wildlife species to others. Berkes (1988) describes the obligations Chisasibi Cree hunters hold during their hunts, including that they not only show respect toward hunted wildlife, but that hunters act modestly and in deference to the animal hunted. This protocol was referred to by many community members during spiritual gatherings that I attended, such as sweat lodge ceremonies, and during my interviews. For example, one male elder who used to hunt frequently stated that all animals involved in the hunt should be 'treated well' (Interview #3). Such treatment included feeding sled dogs good food like meat from the hunt or fish that was stored for the winter. Giving thanks to any animals that may assist with the hunt was important to the hunting process. For example, hunters provide pieces of fat from a hunt to the Whisky Jack[34] as a way of thanking the animal for showing the hunter where to hunt. Hunters are also reported to say a prayer to thank the hunted animal for 'giving itself' to the hunter for sustenance. If the hunter boasts about his or her expertise with the hunt or knowledge of animals, the hunter may jeopardize his relationship with the animal (Huntington and Fernandez-Gimenez, 1999). According to Stevenson (1997a) Native people feel more at ease with the concept of managing their relationships with wildlife rather than directly managing wildlife. Some of the respondents in this study explained this concept by stating that only God (or the Creator) can control the natural world in which all species are interdependent on each other and their surroundings.

[34] Whisky Jacks are also known as Canada Jays or Gray Jays (*Perisoreus canadensis*).

> The Dene recognized that the land and the gifts of the land belong to no one individual, but were meant to be shared by all creatures...the Dene accepted their collective role as caretakers of the land, responsible for ensuring that the earth and her gifts were used with respect and gratitude. As caretakers, the Dene had responsibility for protecting the earth so that the natural resources of the land would continue to provide for the survival of future generations of Dene (Malloch, 1984, 7).

Culturally appropriate wording that respects local values, and words that hold meaning to local communities, should be used in the development of wildlife co-management programs (Kofinas *et al.*, 1999). Other researchers suggest that wildlife management really means the management of human use of a resource as opposed to merely controlling animal populations (i.e., Riewe and Gamble, 1988) and that management practices tend to overlook local values and relationships with wildlife (Kofinas *et al.*, 1999). As such, the human element and local social context should be given heavy consideration for the introduction and implementation of resource management projects in Native communities.

According to Ohmagari and Berkes (1997), the sharing of resources, especially foodstuffs, is part of the Cree cultural values and was also an important part of the hunt to the people of Fort Resolution (Interviews #14, 15). In their study of the transmission of bush skills and knowledge of the Western James Bay Cree women, Ohmagari and Berkes (1997) also found that traditional activities such as goose hunting were still perceived as a traditional activity although a shotgun was now the tool used for hunting. A few participants spoke of the changes in hunting methods with the use of machines. They expressed the importance of maintaining a respectful attitude toward wildlife and the hunt even with increased modern technology use in the hunt. One respondent also explained that with the high costs of gasoline and equipment hunters were now going on shorter hunting expeditions (Interview #30, see also Chapter 2). Although traditions or 'methods of doing' may change, the philosophies upon which these traditions are based remain fairly constant. This flexibility of indigenous cultures to use or accept new technologies may be considered important to the potential functioning of the recovery project as well as other joint projects. For example, one respondent said it was "okay" for bison to be handled in a captive situation as long as the bison were treated with the utmost

respect (Interview #23). Other researchers articulate that culturally consistent management practices and a respect for IK are essential components of resource projects developed by outside agencies with indigenous communities (Stevenson, 1997a; Roberts, 1996; DeWalt, 1994). The goals of the HLWBRP to achieve a healthy, wild herd of free-ranging bison and provide for traditional hunting pursuits of local people are important complimentary goals from the standpoint of people in this study.

During the FEARO hearings and some of my interviews, a few participants recounted statements made by Agriculture Canada representatives that genetically hybrid bison were undesirable in a wild population as akin to a racist statement. Ferguson illustrates this point in her technical specialist report to the FEARO panel:

> Analogies between humans and animals are logical, given the aboriginal belief in the relatively equal standing of the different species...If the bison could be destroyed because they are diseased, could people be destroyed too for the same reason? Are the Indians next? (Ferguson, 1989, 207 & 210).

Some interview participants commented that all species deserved equal and respectful treatment and that neither humans nor animals should be discriminated against on the basis of their race or genetic make-up. Morgantini (1990) noted that there would be no proposal to eliminate the bison based solely on their hybrid status. He argued that the threat of disease to bison, cattle, and human health was incorrectly combined with the genetic hybrid issue in Agriculture Canada's 1989 bison elimination proposal. From this perspective, northern bison issues focused on bison hybrid status was a "false issue" (Morgantini, 1990, 263). Geist (1990) also distinguished between hybrid and disease issues. Further, he contested the genetic purity of replacement animals, from EINP and MBS, in the Agriculture Canada proposal. He compares the hybrid status of northern bison with the crossbreeding of other animal subspecies and emphasizes the need for genetic diversity that would be compromised if the WBNP animals were replaced with descendants of the Nyarling River herd (Geist, 1990). As well, Geist (1990) questioned the ability of Agriculture Canada to completely eliminate bovine tuberculosis and brucellosis in cattle, bison, and other wildlife. The hybrid bison issue has since dissolved with new data on bison genetics (Wilson and Strobeck, 1999) and morphology (van Zyll de Jong *et al.*, 1995)

where these researchers indicate that WBNP and area herds are wood and plains bison combination most representative of the wood bison genotype and phenotype.

Beyond the threat to livestock, Parks Canada is charged with maintaining ecological integrity. One factor that affects Parks Canada, WBNP is whether these diseases are natural or unnatural occurrences in bison. Tessaro (1992, 1989) indicated that the epidemiology and pathogenesis of tuberculosis is the same for northern bison and cattle. Similarly, Meagher and Meyer (1994) attribute the introduction of brucellosis (specifically, *Brucella abortus*) to North American bison by cattle in the early 1900s. Joly and Messier (2001) note that the prevalence of tuberculosis and brucellosis in WBNP bison is, in part, responsible for decreasing bison populations and altered predator-prey relationships between bison and wolves. New evidence of bovine tuberculosis in the remains of a 17 000 year-old bison suggests that tuberculosis is not an "exotic" disease (Rothchild *et al.*, 2001). If bovine tuberculosis is "natural," Parks Canada, WBNP would be even less likely to support depopulation of park bison herds.

The parameters of the northern diseased bison debate have shifted as a result of ongoing research and new directions in management. The Canadian Cooperative Wildlife Health Centre and the Office International des Epizooties (World Organisation for Animal Health) have developed risk assessment guidelines for the translocation of wild animals. Their primary concerns are the risk that translocated animals will either introduce disease to an ecosystem, or that they will become infected by disease in the new ecosystem which may have implications for the transportation of recovery project animals to other areas, such as Elk Island National Park (Canadian Cooperative Wildlife Health Centre, 2002). National and international animal health authorities have moved away from management techniques that are focused on "disease-free herds" and moved toward risk assessment models that focus on the probability that a disease-causing agent is not present in an animal group (Elkin, 2002, personal communication). In 1998, the Canadian Food Inspection Agency's Animal, Plant and Food Risk Assessment Network (APFRAN) calculated

the risk of disease transmission to wild and captive bison as well as to cattle.[35] Recently, APFRAN has completed an initial draft of the risk assessment for the Hook Lake Wood Bison Recovery Project and concluded that the probability that these animals are infected with either tuberculosis or brucellosis is "very low and negligible" (APFRAN, 2001).

Many participants in my research reiterated similar findings as Ferguson (1989); that disease is an unavoidable and natural component of the life cycle. Less than a third of male and female respondents in my study stated that they thought disease was a problem in bison. All of the male and female elders interviewed adhered to the belief that disease was a natural part of the cycle of life and not a threatening factor in the survival of wild bison. Many male elders further stated that any diseases or abnormalities found in bison today were a direct result of improper treatment of the bison, that handling is an unnatural process. Findings by other researchers, such as Byers (1999), report that elders stated that excessive handling of animals such as tagging, radio-collaring, and disease-testing methods caused undue stress on animals. Chasing bison with helicopters, net-gunning animals from helicopters, and injecting them with tranquilizers were cited as resulting in unhealthy animals or animals more susceptible to disease.

> Some harvesters observe that harvested animals which prove to be diseased often bear some indication, e.g., Ear tag, that they have been vaccinated and/or handled in some way. They suggest that either the vaccination itself causes the disease or that the stress created in the animal by the handling makes it less resistant to infection (Ferguson, 1989, 209).

One participant declared that we do not kill people with transmissible diseases, and that bison should be treated as human equals (Interview #8). This is important as some recovery project staff may interpret the above statements as a lack of understanding about how various diseases are spread. These statements reflect cultural beliefs in equality in the treatment of all species as well as recognizing that stress is an influencing factor in diseases such as Tuberculosis in humans and wildlife. Observations made by Fort Resolution residents of animals becoming 'ill' or

[35] The APFRAN results were based on the probability that disease-free bison or cattle will come into contact and become infected with brucellosis or tuberculosis (see APFRAN, 1988 for individual probabilities).

dying as a result of handling concurs with the occurrence of capture myopathy (Hudson and Tennessen, 1978). Enwereji (1999) noted that the Igbo tribe in Nigeria expressed a number of conditions that induce tuberculosis in humans. The Igbo observed that ingestion of protein-rich cattle meat and milk infected with bovine tuberculosis was linked with tuberculosis in their tribe, an observation that was consistent with scientific knowledge (Enwereji, 1999).

Communication and trust between project staff and community members is an important link to the knowledge and perceptions of residents and is addressed in section 6.4.3. A few participants focused on the need for co-operation between project managers and community members. One hunter and another male participant, both of whom had been involved with the recovery project, emphasized the need for people with different knowledge backgrounds to work together and learn from each other.

> Interview #24: When you look at science and traditional knowledge, I think if you put them together I think you could really come up with a good management plan that could be implemented [related to the HLWBRP].

These findings are consistent with other researchers who emphasize the need for integrating or bridging the gaps between TEK and science, but at the same time, take care to avoid the loss of cultural diversity (Agrawal, 1995; Ferguson and Dunnigan, 1998). The recovery project combines elements from these two knowledge sources. Outside government sources provided technological-scientific knowledge including information regarding helicopter capture techniques, administration of antibiotics, and general isolation protocols as outlined by Agriculture Canada (Gates *et al.*, 1998). Elders were flown out to the Hook Lake area to observe and consult with government personnel during the calf-capture process. One male hunter elaborated on this view by explaining that he thought that the recovery project got off to a 'good start' at the beginning (Interview #1). He said that he was pleased that the staff talked with elders and took them out to view the calf-capture process, but that continued (and increased) interaction between project staff and community members was required for the future success of the recovery project.

One participant familiar with the recovery project asserted that the community members themselves needed to make a greater effort to get involved with the recovery project (Interview #27). The highest levels of community participation with the recovery project occurred during the calf-capture phase. Coincidentally, this phase contained the highest level of management intensity (based on my informal discussions and personal observations). During this phase of the project community youths would volunteer to help bottle feed the calves at the project facility. Parents, elders, community leaders, and other community members would often accompany these youths to the facility to observe and speak with project staff. As well, several local news groups (i.e., the Hub newspaper, CBC North TV crew) would attend the facility to document this phase of the project.

Residents described local social changes as influential on community involvement in community-based projects. Many participants spoke of changes in the community and a loss of traditional culture, especially in the younger generations. The loss of the Chipewyan language in adults and youth was identified in a recent community needs assessment and since then a Chipewyan language group has been established (Simon, personal communication, 1999). This assessment and my discussions with residents also identifies a community concern that younger generations are spending less time with elders and on the land, thereby stimulating less interest in learning from local elders. Malloch (1984) identifies government school systems, decreased time spent on the land and a loss of traditional language as contributing factors in the deterioration of the relationships between elders and youths. As younger generations spend more time in school and less time on the land, the interdependence between family members decreases. "The elders cease to be significant role models, and children lose respect for the knowledge, skills, and judgement of their parents and grandparents" (Malloch, 1984, 27). Huntington and Fernandez-Gimenez (1999) relate the decreased use of traditional languages by youths as a further hindrance in elders' transmission of IK. Other researchers echo this finding and link the uncertainty of unresolved land claims with residents' fear of losing their hunting rights, and their connection with the land or their 'sense of place' (Little Bear, 1996; McCormack, 1996).

6.1.2 Community priorities for the recovery project and wild herds

Residents more actively involved with the project appeared to have a greater knowledge of the project and generally a more favorable outlook of the success of the recovery project than those not involved with the project. For example, one participant specifically stated that he was happy when recovery project leaders invited elders to attend meetings where project staff showed maps of prescribed burn areas, and asked their opinions about the habitat enhancement phase of the recovery project. Male participants were slightly more informed about the details of the recovery project than female participants. Male residents appeared to visit the facility more often than female residents except during the calf-rearing stages when men and women would accompany their children to help feed the calves. Male participants expressed greater satisfaction with the recovery project.

Respondents suggested a variety of options for the future care of recovery project animals. These ranged from slow or hard release of the bison back into the wild to keeping the herd in town and selling meat or animals for revenue for the community. Both male and female participants as well as elders were highly in favour of returning the bison to the Hook Lake area. Several male respondents expressed concern about the habituation of the recovery project animals and their response to hunters or wolves in the wild. Many of these people recommended that fencing and monitoring systems be established to ensure the re-adaptation of the bison to the wild. Female participants spoke more often of the spiritual nature of the bison and were more optimistic than men of the bison's survivability if they were returned to the wild. Even some participants who were against the capture and treatment of the bison at the facility were in favour of habitat enhancement. Some qualified their agreement with this phase by stating that prescribed burning was consistent with traditional pursuits and that they had seen the benefits of burning (i.e., new, good grass for many wildlife species).

Ferguson (1989) noted in her technical specialist report on Aboriginal perspectives that Native communities have emphasized the need for long term planning and that they are concerned about future generations. Several community members expressed concern, during my interviews, about the welfare of the existing herds and their perceptions of a 'wait and see' approach held by project managers. These

respondents appeared apprehensive when they said that project leaders did not have secure long-term plans. For example, a few participants were worried that release options had not been thoroughly developed and that those options should have been explored before the recovery project began. According to my results, there is a continued strong opposition in male and female participants across all ages to slaughter the wild herd, as noted at the FEARO panel hearings (1990) and by Ferguson and Burke (1992). My respondents elaborated their concerns and gave examples such as a loss of hunting opportunities for future generations and changes in ecosystem function (predator-prey roles, loss of grasslands habitat due to decreased grazing pressure). According to other researchers, Aboriginal people relate their association with the land with retention of hunting and treaty rights (Little Bear, 1996; McCormack, 1996; Usher; 1987). As well, a few male hunters in my study who were opposed to the elimination of the wild herd asserted that the absence of bison in the area for a number of years could cause changes in ecosystem dynamics and predator-prey relationships. A few male and female participants asserted that vast quantities of meat could be wasted during such a slaughter of WBNP and area bison and that this action goes against the principle of respect for the animal and only taking what is needed for sustenance.

Male and female participants emphasized the strong link between the bison and community members, that all beings were inextricably linked to the land. One female elder specifically declared that no one other than the Creator had the power to know what animals feel (Interview #20). Another female participant expounded on the power of the Creator as the only entity able to decide who should live and who should die. Other researchers have noted that only a spiritual being, such as God or the Creator, can manage animals and that Native people view themselves as 'caretakers' of the environment (Stevenson, 1997a; Berkes, *et al.*, 1991). Project managers' recognition of such spiritual beliefs present a special challenge for developing mutual respectful relationships between themselves and concerned community residents.

6.2 Suggestions for improved communication between project managers and the community

The need for co-management partners to overcome linguistic and cultural barriers is a recurring theme in co-management literature (Stevenson, 1997a; Roberts, 1996; Notzke, 1993; Osherenko, 1988c). Kruse *et al.* (1998) suggest that cooperation is promoted by good communication and the ability of managers to share the meanings and goals of co-management projects with resource users. "The higher the perceived quality of data available and applied to management, the greater the likelihood that management actions will be accepted by traditional users" (Kruse *et al.*, 1998, 449). The majority of elders in the community prefer to speak their native language (primarily Chipewyan), but many listen to their radios, especially CBC radio's Chipewyan hour. In fact, a couple of my interviews with elders were specifically arranged so that the participant would not miss this program. This would be an ideal opportunity for elders and other community members to learn about the recovery project. Project updates, meeting times and locations, contact names and phone numbers, and invitations to the facility could be translated into Chipewyan and read during the radio broadcast.

Television Channel 10, a community channel featuring local news and events, could also show written project updates in English and Chipewyan, as well as provide meeting or contact information. Although some posters were put up to announce recovery project presentations, community members declared that they did not see them. During my time in Fort Resolution, I noted that a popular message board located at the Band office could become covered with such a vast number of posters that it was difficult to distinguish one from another. Another difficulty associated with using posters as a method of communication was the lack of literacy, especially in the English language.

Elders' difficulties understanding English could be alleviated by the presence of an interpreter or translator at meetings. A translator could also explain Chipewyan words and their meaning to English-speaking participants (i.e., project managers). This could also help to increase community participation by involving the Chipewyan language group to assist with translation at meetings. Language is an important component of human perceptions and functions, "as filters between us and the world

we perceive" (Holmes, 1988). Community awareness and acceptance of a common goal requires agreement between all parties of the appropriate terminology.[36]

Roles and responsibilities of the co-management parties need to be clearly defined in the HLWBRP. This finding is consistent with other researchers who have examined co-management regimes (Kruse *et al.*, 1998; Berkes, 1995). Communication of responsibilities and liaisons between project managers and community members could be improved through the establishment of a project co-ordinator position. This position should be occupied by someone who would reside in the community where he or she could maintain regular contact with community residents. A selection committee comprised of AWHC members, project managers, and other interested community members could choose from applicants for this position, including a member of their organization. It is also important to note that many residents already involved with multiple organizations may not have sufficient time and resources to devote to a project liaison position. The Deninoo Buffalo Steering Committee was established with the development of the HLWBMP and could nicely fill the role of the selection committee. Given community political dynamics, this may be a challenging task. As mentioned in the 1991 management plan, the Deninoo Buffalo Steering Committee was designated to oversee and evaluate the management plan.

> The Deninoo Buffalo Steering Committee in consultation with the Department of Renewable Resources will assume responsibility for monitoring the implementation and assessing the effectiveness and appropriateness of the Hook Lake Wood Bison Management Plan.
> (Deninoo Wildlife and Resources Committee, 1991, 26).

[36] For example, Inuit and DFO formalized the concept of the 'conservation' of beluga whales in the Southeast Baffin area as: "the preservation, maintenance and enhancement of the traditional relationship between Inuit and the animals upon which the economic, social and cultural survival of the Inuit depend." Agreement was also reached that the term 'management' would refer to "the nurturing of this relationship" (Stevenson, 1997a, 15).

This committee could also develop more defined roles and responsibilities of project managers and the community. Additionally, they could approve future management decisions and monitor community satisfaction and participation with the HLWBRP. The project co-ordinator would be instrumental in acquiring community perspectives on these issues and report to the committee with recommendations. The co-ordinator position would need to be a full time job given the importance of liaising with project managers and community members, and because people involved in DCC, MN, and DKFN are often committed to numerous committees. Ideally, this person would be fluent in both Chipewyan and English in order to communicate with elders as well as the technical specialists involved with the project. Many researchers stress the importance of personal communication, such as through informal 'word-of-mouth' dialogue, between managers and resource users (Kruse *et al.*, 1998; Hanyani-Mlambo and Hebinck, 1996; Roberts, 1996). This person could facilitate meetings between project managers and residents as well as initiate presentations to the community from other Aboriginal groups involved with co-management projects. For example, the Waterhen First Nation in Manitoba initiated a co-management project with the province to establish a free-roaming herd of wood bison as well as develop commercial opportunities for the Band (Notzke, 1994). The Intertribal Bison Co-operative of South Dakota has based their bison recovery projects on the rehabilitation of the land, and re-vitalization of culture and health through the management of plain bison herds (Intertribal Bison Cooperative, 2001; LaRose, 2001).

Lessons learned from these projects, and possible others could benefit the HLWBRP. One participant who was knowledgeable about other bison recovery projects expressed that the release of the HLWBRP bison back into the wild would have similar results to the MBS.

> Interview #23: I think they [bison in HLWBRP] will have a really good chance [of surviving] from [observations about] the bison who have been released to the MacKenzie Bison Sanctuary. [They] have really flourished and really been successful. I don't see why ours can't. It would be the same.

Community members' trust in the project managers may also be improved by discussing resource co-management projects with members of other Aboriginal or non-Aboriginal communities. Some community members already encourage exchange between other communities. For example, an elder from Alberta frequently visited Fort Resolution to facilitate local sweat lodge ceremonies. He shared his knowledge and promoted discussion within the group at these ceremonies about local concerns or issues. Residents who attended these ceremonies appeared to appreciate this connection with another community.

6.3 Community acceptance & trust

Trust is an essential component of social relationships in daily life that influences co-operation and communication among individuals and different groups of people (Wortley, Krogman and Davidson, 2001; Gambetta, 2000; Good, 2000; Molm *et al.*, 2000). Lewis and Weigert (1985) suggest that trust simplifies the decision-making processes used by people in a society and reduce the uncertainty of their decisions. Decisions are simplified because the reciprocal exchanges in trustful relationships increase participant confidence in satisfactory outcomes. They further describe Anderson's (1971) principles of trust levels, of which two apply to the HLWBRP.

> (1) the greater the homogeneity of the group, the higher is the level of trust;
> (2) the greater the social change, the lower the level of trust. (Lewis and Weigert, 1985, 980).

My fieldwork indicates that many residents within Fort Resolution do not necessarily consider their community homogeneous. Fort Resolution is primarily a Dene and Métis community. Many local people have mentioned an ongoing feud between two families in the community that dates back to the fur trade of the early 1800s.[37] A few residents have stated the occurrence of "us versus them" encounters within the community and among community members and government staff. For example, resident satisfaction with local community programs appeared to be influenced, in part, by each individual's relationship with others in apparent positions of power. While interviews with community members suggested that their acceptance of the

[37] This feud is said to have originated when two kin (family) groups were employed by different trading companies, one by the Hudson's Bay Company and the other by the Northwest Trading Company.

HLWBRP strongly relied on their knowledge of the project and their perceptions of project managers, residents with limited information about the recovery project reported that those in politically powerful positions (in the Band or with the GNWT) made decisions and were 'in charge' of the project. Thus, those with less exposure to the project were more likely to report that individual community members lacked a voice in daily management practices. If some people in a partnership perceive an imbalance in the equality of partners, then their behavioural commitment to other partners may shift and limit their trust of the situation (Molm *et al.*, 2000). In Fort Resolution, this lack of trust may be linked to a decrease in participation at community meetings. This decreased interaction between partners does not allow for an exchange of information between partners, resulting in increased uncertainty and unchallenged assumptions that likely hinder the development of trust (Molm *et al.*, 2000).

My fieldwork also indicates that the social changes experienced by Fort Resolution residents have affected their trust in fellow community members as well as outside agencies. A few participants alluded to changes in the community, especially since the road was established in 1972. Respondents explained that there were many social changes within the community, such as the decline of trading routes and fur trade in the area, the disruption of residential schools, the development of a permanent road into the community, and the loss of the local forestry industry. They talked about changes in younger peoples' attitudes, a loss of respect, and a loss of traditional knowledge. Several respondents also talked about the increase in social problems such as drug and alcohol abuse. One participant who had spent some time outside the community described the relatively recent social and behavioural changes in the people in Fort Resolution.

> Interview #27: People are so disrespectful- even of the elders, of their parents. But, mind you, disrespect is not something (pause) that's a learned behaviour. I guess it's something they have to [show], in order to survive some of them...there's lots of social problems and stuff. That they're not willing as a community to ahh to face or to admit it [the decline in norms of respect]. See these problems that they have today, you didn't have that when I was a kid growing up.

One of the female elders stated that she preferred not to attend community meetings since too many people argue and appeared unable to calmly speak to issues (Interview #16). She said that she tried to stay out of local politics and not get involved with controversial issues (also mentioned in Interview #27).

Affective commitment is the positive evaluation of and fondness among partners that is necessary to build trust between people (Molm *et al.*, 2000). Resident perceptions of previous exchanges with government representatives have contributed, to some extent, to their opinions about current government employees. Some community members cite past contentious management programs such as the anthrax round-ups and wolf poisoning population measures as shaping their mistrust of government representatives (i.e., biologists, scientists). This concurs with research by Kruse *et al.* (1998) regarding caribou hunters' experiences with, and perceptions of the credibility of government mangers. They suggest that several benefits are incurred when biologists maintain frequent interactions with community members, such as:

- Gaining personal acceptance and establish trust by participating in the life of the community.
- Making user concerns, beliefs, and perceptions more salient.
- Providing for culturally appropriate community-based decision making.
- Providing a better way for biologists to explain their ideas and methods (Kruse *et al.*, 1998, 457).

Fostering relationships between community members and area biologists is crucial for shared decision making processes in co-management projects (Kruse *et al.*, 1998; Osherenko, 1988c). It is also important to note that many government employees are involved in several resource management projects that may require extensive travel, especially in northern Canada. Trust between several community members and one of the project managers has been enhanced by the time he has spent in the community and his 'out-going' nature (data from interviews and informal conversations). This frequent interaction (Molm *et al.*, 2000) has resulted in community members and this manager to share information (Hawthorn, 2000) that has allowed residents to develop affective commitment toward and trust of this person. Extensive stays in all communities may not always be financially or logistically practical. This is an important factor in the HLWBRP as the project

managers are involved in a variety of northern management projects. A local project co-ordinator position could serve as a critical resource person to building greater trust between project managers and community members (see section 6.2).

According to Stevenson (1997a, 16), co-management requires shared authority between partners as well as the, "building of mutual respect, trust and understanding." Shared decision-making processes between co-management partners are promoted when meaningful communication exists between resource-users (or residents) and project managers (Kofinas *et al.*, 1999; Stevenson, 1997a) This exchange between partners requires that each partner work towards a 'common ground.' Such efforts may include terminology that is understood by all (Roberts, 1996; Osherenko, 1988b,c) and management practices that respect cultural and scientific perspectives (Enwereji, 1999; Kofinas *et al.*, 1999). Gambetta (2000) asserts that initial trust builds upon itself and invites further trust and commitment. Trust and acceptance between partners is influenced by the exchange between individuals, especially within the context of community participation in the HLWBRP.

6.4 Community participation

As mentioned in section 5.6, the greatest community participation in the recovery project appeared to occur during the calf-capture phase. Residents continue to drop by the facility, but on some days there is no one at the facility with whom to talk. As well, a few respondents mentioned that they only saw some of the project staff during disease-testing phases (another more highly managed event) and that they did not get a chance to talk with the staff in depth about the project.

Tours could be given at the recovery facility by project staff when they are in town for update presentations. GNWT scientists and elders could participate at yearly TK and SK workshops out on the land; this could be beneficial for both sides as a means to 'get to know each other', increase understanding of different worldviews, and generate joint recommendations for the future management of the project. Many elders have difficulties attending meetings as some people cannot walk any further than the Northern Store (across from the Elders facility). Project staff could co-ordinate with local governments and staff at the Elders facility to offer transportation

to meetings. The Elders facility is a popular gathering place that could be used for informal meetings to increase elder participation.

At this time there are no ongoing school projects that incorporate the recovery project with classroom studies. A few participants recommended an increase in the involvement of youths in the community through school projects. They further described projects that could combine the natural history of the area with traditional skills and biological studies. Kroma (1995) also advocates the use of indigenous knowledge in the science curriculum of schools in Third World countries to improve the enrollment and success of students. Other researchers express the need for Aboriginal views to be recognized in education systems to encourage community identity and commitment to honouring accumulated knowledge (Fitznor, 1998; Kimmerer, 1998; Fehr and Hurst, 1996). During my time at the local school, several students expressed their curiosity about and interest in the recovery project and bison calves. School projects, such as writing competitions, could address the role of bison in community identity. The Deninoo School (K-12) is located in the community and within walking distance of the project facility. Students could assist the herdsman with the day-to-day care of the bison and with the handling process (i.e., during disease and pregnancy testing). Classroom activities could include discussions with project managers and technical specialists about the scientific basis for the project, and visits from elders to discuss the indigenous knowledge that is used on the land and in co-management projects. Field trips could be scheduled to the Hook Lake area for practical experiences with elders (proper hunting methods, living off the land) and biologists (populations counts, vegetation analysis).

In addition to individual projects, groups of students could assist a project liaison (co-ordinator) with the creation of a HLWBRP newsletter. Currently project managers produce progress reports that address the scientific and technical aspects (goals) of the recovery project. A community newsletter could address the biological aspects of the project, but also include cultural information. Spiritual teachings could include the significance of bison to the local culture and proper ways of interacting with the environment while practical information could include hunting practices and meat preparation methods and recipes.

I began my first community presentation (calling it a community sharing session rather than just another presentation) with a typical audience versus presenter set-up. My presentation was held at the Aurora College, a familiar and neutral venue near the Hall and Band Office. I used an overhead projector in order to show quotes from my interviews and provided these on paper since my presentation was also part of the Adult Basic Education classes. I walked amongst the rows of tables, but kept primarily to the front so that I would not have my back to anyone. Those in attendance were very enthusiastic about participating. For my final presentation and as a recommendation to other presenters, I recommend that each session should be focused on sharing and set up to encourage participation with 'presenters' and 'attendees' on an equal level. For example, group meetings could take place at more neutral but still familiar gathering places such as the Elders facility, the local schools, or the community hall. Many community members view government offices (i.e., Band, Métis Local #53, Development Corporation offices) as too formal and uncomfortable. Presenters could also engage face-to-face discussions with community members by sitting with the audience in a circle or as a group, thus creating a more informal setting conducive to shared communication, which follows a more traditional practice of knowledge sharing.

6.5 Meeting my objectives

Finally, I summarize how this project has fulfilled my original research objectives.

1. Determine if the HLWBRP is consistent with the cultural ethics, views, and knowledge of the local people.

The process of determining the 'cultural fit' or effectiveness of a wildlife co-management project in a Native community requires an exploration of cultural and local history. Given that community members of Fort Resolution hold a relationship with bison that is documented as far back as the early explorers, it is clear that the management of northern bison is of great importance to residents. Participants suggested ways to make the recovery project more culturally appropriate. For some residents this meant a decrease in the amount of handling, while others emphasized respect for the spirit of the bison could be shown through ceremonies conducted by

elders. The cultural consistency of the project, as reported by participants, was not just the treatment of bison, but encompassed the social context of the community and communication among residents and project managers. These priorities included residents' requests for more appropriate decisions through improved awareness of community members about the project and improved awareness of managers about residents' spiritual and cultural connection with bison.

Community member's knowledge of the HLWBRP and disease contributed to their perceptions of the success of the recovery project and its 'cultural fit' with the community. It is meaningful to note that all study participants, and residents who I encountered, were very responsive to this study and happy to share their knowledge about bison and their culture. They were amicable to discuss their concerns about bison diseases and management and eager to gain a more complete understanding of the project.

2. Describe community priorities regarding the future of the recovery project for captive and wild herds.

Through in-depth interview and observation methods, I was able to describe specific priorities held by community members about the future of local bison herds. Study participants expressed an interest in the improvement of community participation in the decision-making process for the HLWBRP. Respondents emphasized the need for developed plans for the future care of the HLWBRP animals and wild. This priority was exemplified by the statement made by one participant, who was very knowledgeable about the recovery project details, that the project had achieved the 'first step' (apparent success in developing a disease-free herd), but that the lack of well-established management plans for the future had left the project 'in limbo' and had left community members uncertain about their continued, serious involvement in the decision-making process. The development of good management plans for the future of the HLWBRP and HL herds requires communication and trust between all co-management partners.

The majority of residents remain vehemently opposed to the elimination of the wild herd of bison in the Hook Lake and other Slave River Lowlands areas. Their opposition is linked to perceptions that there are no unnatural disease problems, that there is a decrease or stabilization in the prevalence of disease, that killing many bison could exacerbate current threats to traditional hunting rights, and that culling these animals could diminish ecosystem function and disrupt predator-prey relationships. Returning the recovery project animals to the wild was a priority for a majority of the respondents interviewed, although many residents cited constraints to the release of the HLWBRP animals to the wild. For example, some residents questioned the ability that the captive bison would have to adapt to survival in the wild and their ability to respond to predators. In response to this concern, participants recommended a gradual release program. There remain differing opinions on the exact fate of the animals, the project, or the Hook Lake area, but there is a consensus among participants that respect for the animals and the land must be part of that future.

3. Describe commercial options and opportunities as viewed by local residents.

Economic development is a concern for Fort Resolution residents, in part, due to an increased emphasis on the wage economy and limited opportunities for local employment. Participants affirmed that perpetuation of traditional pursuits was an essential component of their way of life. Although residents did not address this objective as vigorously as the management priorities for bison herds, I was able to describe that economic options were a priority for some residents. These included: the use of bison meat to re-instate community freezers, the initiation of big game or trophy-hunting for sport hunters, the selling of bison meat or hides to retail stores, and the development of cultural eco-tourism programs for travelers.

6.6 Practical contributions of research

Native views about the commercialization of wildlife, specifically bison, may be incorporated into future ranching projects that are near or in Aboriginal communities. My description of participants' perceptions of partnerships with outside agencies may be useful to implement future co-management projects. A summary of community perspectives will inform the recovery project managers and administrators about community priorities that are often hidden from view, and the reasoning behind community perceptions. This study provides community recommendations for the recovery project regarding community involvement and participation. These findings may also provide project staff, community governments, and outside agencies, such as the Territorial Farmers Association, insight into the community members' perceptions about a potential commercial market for surplus animals and meat.

After spending three summers and a winter-spring season in Fort Resolution this research contributed to an increased community awareness of the recovery project. As a result of my interviews and informal discussions with community members, many people have heightened awareness and interest in the project, demonstrated by the follow-up questions they had after the interviews and continued interest I have witnessed in the community. Several people called me "the buffalo girl." I returned to Fort Resolution in the fall of 1999 and lived in the community from January – August 2000 to begin writing my thesis. This allowed me to maintain my connection with community members through regular visits to the common gathering places, like the Northern Store, the Band Office Complex, and the Elders Facility. My preliminary findings from the coding of interview transcripts were presented in Fort Resolution on November 21, 2000. Throughout my stay in the community I shared information about the recovery project, provided pamphlets about the recovery project and wildlife diseases, and invited residents to visit the recovery facility and approach the managers with their comments or questions. Participants were eager to participate in my interviews and expressed a genuine interest in bison issues.

Randy Henderson, reporter with the CBC Radio's morning Trailbreaker program interviewed me about my research a week after my community presentation in November, 2000. This also allowed me to reach a greater number of people in the community and contribute to public knowledge about the recovery project throughout

the Northwest Territories. I was able to communicate my research to a larger audience at the International Bison Conference during August 2-4, 2000 in Edmonton, AB. I presented a summary of my research at meetings prior to the conference, participated in the poster sessions with a description of my research to date, and organized the First Nations Plenary Session. The conference was attended by biologists, veterinarians, representatives of North American Native communities, bison ranchers, academic researchers, and general public members.

Copies of my completed thesis will also be provided to the community of Fort Resolution, Territorial Farmers Association (TFA), University of Alberta, Aurora Research Institute, Canadian Circumpolar Institute, and the Department of Resources, Wildlife and Economic Development (GNWT). Additionally, I will provide the community and the TFA with copies of publications from this research.

6.7 Recommendations for future research

The findings of this research have both academic and practical applications. This research contributes to the wood bison disease issue literature by illustrating the perspectives of a Native community ten years after the FEARO panel hearings and explores ways to improve community satisfaction with the project as it continues.

A longitudinal study could be implemented in five years to address community satisfaction with the HLWBRP as the project continues. Repetition of this or a similar study could examine the status and progress of the project, changes in community perspectives, or changes in future goals for the recovery project. Given the highly charged nature of the northern diseased bison issue, it would also be interesting to follow Native perceptions of, and involvement with, bison management decision-making processes over the next ten years.

Effective programs to address community awareness of and support for the recovery project (e.g., regarding awareness about diseases, acquiring disease-free status, goals and phases of the recovery project) could be assessed by future research projects aimed at developing improved communication methods between project managers and community members (see section 6. 2).

Due to time constraints and availability, younger residents were not formally interviewed since many youth were busy working inside and outside of the community during my summer field season. A study could be expanded upon to include youths, perhaps during the winter months, to compare with the results with this research. Several youths were involved with feeding calves during the calf capture phase of the project and some have since moved away to attend other schools. It would be important to explore their perceptions of the recovery project, and how the project fits with their education, given that the younger generations will come into power and be involved in the future decision-making processes for the HLWBRP. Including community members as researchers (i.e., interviewers) as well as providing reflective periods for participants, followed by in-depth secondary interviews could increase the participatory nature of my research (Huse and Postlthuwaite) and create a larger sample size.

Respondents indicated a preference for wild meat, such as bison to meat that could be purchased from the Northern store, and stated that bison meat was healthier and tastier than any other wild meat. Concerns were also raised during interviews that youth in the community would not always have the opportunity to eat bison or other wild meat. In a book compiled by Beaulieu (1987), a few elders also referred to their preference for high quality country foods over store bought items. "People lived longer in the old days. The people were healthy in those days. They were healthy because they lived on wild meat from the bush and they didn't eat many things from the store" (Fabien in Beaulieu, 1987, 10). Participants also spoke of changes in food sources and attributed them to changes in the environment. For example, elders reported that caribou populations have moved further away from the community as a result of climate change and increasing levels of pollution in the water and ground systems. Other participants linked changes in animal populations to the inappropriate treatment of wildlife (e.g., that one young hunter teased a caribou, so the whole herd moved away). Although outside the scope of my research, a comparative qualitative study could build on information gathered by Bodden (1981) and Smith (1978). Such a study could compare the importance of bison, caribou, moose, and small game in the diet of Fort Resolution residents, and compare the cultural significance of each species to residents.

Few literature sources exist regarding Native perceptions of commercialization of wildlife. Within the context of my research, community members expressed concern about the lack of economic development opportunities in Fort Resolution. Many participants held that providing bison meat to community members was important to continuing a ritual of a traditional lifestyle. Notzke (1994) found that the Innu were favourable towards the commercialization of wildlife only so far as it did not jeopardize local access to wildlife. Similarly, Dragon (1998) explained numerous difficulties to market wild meat, such as costs of transportation and marketing to Southern buyers. It would be helpful for a community-based study to describe the perspectives of Native people, specifically in regard to their priorities for economic development in relation to opportunities to market local meat given the tradeoffs involved. Such a study could also be combined with an exploration of indigenous epistemology regarding wildlife commercialization within the community of Fort Resolution or other Aboriginal communities involved with wildlife co-management projects.

6.8 Final thoughts

Increased regard for species conservation and biodiversity in western industrialized nations has, in part, resulted in a change in the dominant social paradigm to a new ecological paradigm in mainstream North American thinking. A "New Ecological Paradigm" includes the assumption that humans possess unique traits of technology and culture, but that they exist as merely one of the many interdependent species immersed in a global ecosystem (Dunlap and Catton, 1979). This paradigm represents a shift toward, perhaps a return to, a more holistic and ecocentric way of thinking.

While western society turns increasingly to such entities as herbal remedies, organic productions, and traditional medicines it is interesting to note that rules and values regarding the proper interaction between humans and nature can be traced back to the ancient world. In mythical stories such as Artemis and Acteon, Acteon's own

hunting dogs ripped him to pieces after Artemis,[38] the Greek goddess of hunting and nature, transformed him into a stag. There are two explanations of this event, but they both reflect Acteon's maltreatment of his relationship with nature:

> For whether Acteon made an improper use of the spoils of his hunting ... or whether he was so bold as to assert that as a hunter he was to be preferred above her before whom even gods withdraw from rivalry in the chase, all would agree that the goddess was justified in having become indignant at him (Diodorus of Sicily In Oldfather, 1946, 75).

Freeman (1985) asserts that resource management efforts often place considerably more emphasis on the techno-scientific processes of management than on human organization and management. Holistic perceptions of the environment and human relationships with nature are intrinsic to beliefs and attitudes of Native communities. Such holistic beliefs call for different "management systems" for wildlife conservation that focus on human management. Acknowledgement and communication of these differences is an important process to achieve compromise and understanding among co-management parties, especially for co-operative, science-based projects within Native communities.

The management of northern diseased bison is an ongoing, complex issue with no simple solutions. Extensive research exists in the areas of indigenous knowledge and the importance of local participation in co-management programs. Equally prevalent is research focused on the diseases in northern bison populations and the techniques that have been used (and are being used to this day) to manage these animals. This research contributes directly to these fields through an exploration of Aboriginal perceptions of a science-based co-management project and the requirements necessary to facilitate improved relationships between co-management partners.

---

[38] "In the Iliad Artemis is called Mistress of Animals, potnia theron, obviously a well established formula, and this has justly been seen as a key to her nature... This Potnia Theron is a Mistress of the whole of wild nature, of the fish in the water, the birds if the air, lions and stags, goats and hares... Always and everywhere Artemis is the goddess of hunting and of hunters" (Burkert. 1985, 149).

References

Abel, Kerry M. 1993. *Drum songs: glimpses of Dene history*. Canada: McGill-Queen's University Press.

Agrawal, Arun. 1995. Dismantling the divide between indigenous and scientific knowledge. *Development and Change* **26**: 413-439.

Agriculture Canada. 1989. *Agriculture Canada's submission to the Northern Diseased Bison Assessment Panel*. Ottawa: Agriculture Canada. 96p.

Anderson, Joan M. 1993. Ethnocultural communities as partners in research. Pp 319- 329 in: Ralph Masi *et al.* (eds). *Health and cultures: exploring the relationships, policies, professional practice and education*, Volume 1. Oakville, ON: Mosaic Press.

APFRAN. 2001. *Risk assessment on bovine tuberculosis and brucellosis in wood bison of the Hook Lake Recovery Project*. Animal Health Risk Analysis. Animal, Plant and Food Health Risk Assessment Network. Canadian Food Inspection Agency. June, 2001.

APFRAN. 1998. *Risk assessment on bovine brucellosis and tuberculosis in Wood Buffalo National Park and area*. Animal, Plant and Food Health Risk Assessment Network. Canadian Food Inspection Agency. September, 1998.

Appiah-Opoku, Seth and B. Hyma. 1999. Indigenous institutions and resource management in Ghana. *Indigenous Knowledge and Development Monitor* 7(3): 15-18. URL: http://www.nuffic.nl/ciran/ikdm/7-3/index.html.

Atkins, Beryl T., Alain Duval, Rosemary C. Milne, Pierre-Henri Cousin, Helene M.A. Lewis, Lorna A. Sinclair, Renee O. Birks, and Marie-Noelle Lamy. 1988. *Collins-Roberts French-English Dictionary*, Second Edition. Toronto: Collins Publishers. 929 pp.

Barnhart, Clarence L and Robert K. Barnhart (eds). 1987. *The World Book Dictionary*, Volume Two L-Z. Toronto: World Book, Inc. 2430pp.

Beaulieu, Gail (ed).1987. *That's the Way We Lived: an oral history of the Fort Resolution elders*. Northwest Territories, Outcrop, Ltd. 98 pp.

Berkes, Fikret. 2001. Religious traditions and biodiversity. Pp 109-120 in: S. Levins (ed). *Encyclopedia of Biodiversity*, Volume 5. San Deigo: Academic Press.

Berkes, Fikret. 1999a. *Sacred ecology, traditional ecological knowledge and resource management*. USA: Taylor & Francis. 209 pp.

Berkes, Fikret. 1999b. Role and significance of 'tradition' in indigenous knowledge. *Indigenous Knowledge and Development Monitor* 7(1): 1-2. URL: http://www.nuffic.nl/ciran/ikdm/7-1/index.html.

Berkes, Fikret. 1997. New and not-so-new directions in the use of the commons: co-management. *The Common Property Resource Digest* No. 42: 5-7.

Berkes, Fikret. 1995. The role of co-management in conservation planning. Pp 202-208 in: P. Jonker (ed.). *The Churchill: A Canadian Heritage River*. Saskatoon, SK: University of Saskatchewan.

Berkes, Fikret. 1994. Co-management: bridging the two solitudes. *Northern Perspectives* **22**(2-3): 18-20.

Berkes, Fikret. 1988. Environmental Philosophy of the Chisasibi Cree People of James Bay. Pp 7-21 in: Milton M. Freeman and Ludwig N. Carbyn (eds). *Traditional Knowledge and Renewable Resource Management in Northern Regions*, Occasional Publication No. 23. Edmonton, AB: Canadian Circumpolar Institute.

Berkes, Fikret and Thomas Henley. 1997. The usefulness of traditional knowledge: myth or reality? *Policy Options* **18**(3): 55-56.

Berkes, Fikret, Peter George, and Richard J. Preston. 1991. Co-management: the evolution in theory and practice of the joint administration of living resources. *Alternatives* **18**(2): 12-18.

Bielawski, Ellen. 1992. Inuit indigenous knowledge and science in the Arctic. *Northern Perspectives* **20**(1): 5-8.

Bodden, Kenneth. 1981. *The economic use by native peoples of the resources of the Slave River Delta*. MA thesis, University of Alberta. 176pp.

Burkert, Walter. 1985. *Greek Religion*. John Raffan (trans). Cambridge: Harvard University Press.

Byers, Tom. 1999. Perspectives of aboriginal peoples on wildlife research. *Wildlife Society Bulletin* **27**(3): 671-675.

Canada. 1966 reprinted from 1899 edition. *Treaty No. 8 made June 21, 1899 and adhesions, reports, etc.* Roger Duhamel, F.R.S.C. Ottawa: Queen's Printer and Controller of Stationary. 26pp.

Canadian Cooperative Wildlife Health Centre. 2002. Health risk analysis in wild animal translocations. URL: http://wildlife.usask.ca/english/frameWildlifeTop.htm.

Carbyn, LN, S. Oosenbrug, D. Anions. 1993. *Wolves, bison and the dynamics related to the Peace-Athabasca Delta in Canada's Wood Buffalo National Park*. Edmonton: Canadian Circumpolar Institute. 270p.

Carney, Robert. 1992. Residential Schooling at Fort Chipewyan and Fort Resolution 1874-1974. Pp 115-137 in: Raymond Huel. *Western Oblate Studies (Études Oblatesde L'Ouest)*. Lewiston, NY: The Edwin Mellen Press, Ltd. 274pp.

Chisholm, J., L. Comin, and T. Unka. 1998. Consensus-based research to assist with bison management in Wood Buffalo National Park. Pp 199-204 in: L. Irby and J. Knight (eds). *International Symposium on Bison Ecology and Management in North America*. Bozeman, Montana: Montana State University.

Colorado, Pam. 1988. Bridging native and western science. *Convergence* **XXI**(2/3): 49-86.

Couture, Joseph. E. 2000. The role of native elders: emergent issues. Pp 31-48 in: David Long and Olive Patricia Dickason (eds). *Visions of the Heart: Canadian Aboriginal Issues*. Toronto: Harcourt Canada, Ltd.

Daniel, Richard. 1979. The Spirit and Terms of Treaty Eight. Pp 47-100 in: Richard Price (ed). *The Spirit of Alberta Indian Treaties*. Toronto: Butterworth and Co. Canada Ltd. 202 pp.

Danz, Harold P. 1997. *Of Bison and Man*. Colorado, USA: University Press of Colorado. 231 pp.

Dary, David A. 1974. *The Buffalo Book: The Full Saga of the American Animal*. USA: The Swallow Press Incorporated. 374 pp.

Deninoo Wildlife and Resources Committee. July 1991. *Hook Lake Wood Bison Management Plan*. Fort Resolution, NT. Unpublished document.

Deninu Kue' First Nation. 1999. *Community Needs Assessment*. Unpublished draft document by the Community Empowerment Office.

Deninu Kue' First Nation. 1992. *Fort Resolution*. Unpublished draft paper for the Deninu Kue' First Nation.

Deninu Kue' First Nation and the Department of Renewable Resources. 1995. *Hook Lake Wood Bison Recovery Project: Phase II Salvage and Propagation*. Unpublished Draft Report, December 1995.

Denzin, Norman K. and Yvonna S. Lincoln. 1994. *Handbook of Qualitative Research*. Thousand Oaks, California: Sage Publications. 643pp.

DeWalt, Billie R. 1994. Using indigenous knowledge to improve agriculture and natural resource management. *Human Organization* **53**(2): 123-131.

Dickason, Olive Patricia. 1999-2000.Treaty Eight- Context and Understandings. Pp 6-28 in: Treaty 8 Revisited: Selected Papers on the 1999 Centennial Conference. *Lobstick: An Interdisciplinary Journal*, Special Premier Issue **1**(1): 6-28.

Dragon, D.C. and B.E. Elkin. 2001. Overview of early anthrax outbreaks in Northern Canada: field reports of the Health of Animals Branch, Agriculture Canada, 1962-71. *Arctic* **54**(1): 32-40.

Dragon, Joe. 1998. Chapter 3: Commercial harvesting of wild ungulates in Northern Canada. Pp 28-37 in: Leslie Treseder *et al. An overview of community-based wildlife management in Canada*. Prepared as a contribution to the "Evaluating Eden" Project. Edmonton, Alberta: University of Alberta.

Dunlap, Riley E. and William R. Catton, Jr. 1979. Environmental Sociology. *Annual Review of Sociology* **5**: 243-273.

Environment Canada. 2002. *Canadian Climate Normals*. URL: http://www.smc.ec.gc.ca/climate/climate_normals_/show_normals_e.cfm?stationid=764&prov=NW .

Enwereji, E. 1999. Views on tuberculosis among the Igbo of Nigeria. *Indigenous Knowledge and Development Monitor* **7**-2. URL: http://www.nuffic.nl/ciran/ikdm/7-2/index.html.

Erasmus, Peter and Geneva Ensign. 1991. *A Practical Framework for Community Liaison Work in Native Communities*. Brandon, Manitoba: Justin Publishers. 85 pp.

Eyzaguirre, Pablo B. 2001. Global recognition of indigenous knowledge: is this the last phase of 'globalization'? *Indigenous Knowledge and Development Monitor* **9**(2). URL: http://www.nuffic.nl/ciran/ikdm/9-2/index.html.

Fals-Borda, Orlando. 1988. Some basic ingredients. Chapter 1 in: *Action and Knowledge Breaking the Monopoly with Participatory Action-Research*. New York: The Apex Press.

Fast, Helen and Fikret Berkes. 1994. Native land use, traditional knowledge and the subsistence economy in the Hudson's Bay bioregion.

Federal Assessment and Review Office. 1990. *Northern Diseased Bison: report of the environmental assessment panel*. Ottawa, ON: Federal Environmental Assessment and review process 35. 47 pp.

Fehr, Alan and William Hurst (eds). 1996. *A Seminar on Two Ways of Knowing: Indigenous and Scientific Knowledge*. Inuvik, NT: Aurora Research Institute, Aurora College. 93 pp.

Feit, Harvey. 1994. Indigenous partnerships in knowledge and northern social research.
Pp 47-57 in: John Stager (ed). *Canada and Polar Science*. Proceedings of a conference sponsored by the Canadian Polar Commission, December 1994, Yellowknife, NT.

Ferguson, Theresa. 1993. Wood Bison and the Early Fur Trade. Pp 63-79 in: P.A. McCormack and R. G. Ironside (eds). *The Uncovered Past: Roots of Northern Alberta Societies*. Circumpolar Research Series No. 3. Edmonton: Canadian Circumpolar Institute.

Ferguson, Theresa. 1990. The "Jarvis Proof": Management of Bison, Management of Bison Hunters, and the Development of a Literary Tradition. Pp 299-304 in: G. Ironside and P. A. McCormack (eds). *Fort Chipewyan - Fort Vermillion Bicentennial Conference*. Edmonton: Boreal Institute.

Ferguson, Theresa. 1989. Native perspectives on the northern diseased bison issue: an outline. Pp 203-215 in: Federal Environmental Assessment Review Office. *Compendium of government submissions and technical specialist reports in response to the panel information requirements document*.

Ferguson, Theresa A. and Cynthia M. Dunnigan. 1998. Literature review of traditional environmental knowledge. Unpublished document, Manuscript reference.

Ferguson, T. and C. Burke. 1992. Aboriginal communities and the northern buffalo controversy. Pp 189-206 in: John Foster *et al.* (eds). *Buffalo*. Edmonton: University of Alberta Press.

Fetherstonhaugh, Robert C. 1938. *The Royal Canadian Mounted Police*. New York: Carrick & Evans, Inc. 322 pp.

Fetterman, David M. 1998. *Ethnography : step by step*. Thousand Oaks, California: Sage Publications. 165 pp.

Field, Dennis. 1985. *Science, process and discovery*. Toronto: Addision-Wesley Publishers Ltd. 187 pp.

Fienup-Riordan, Ann. 1999. Yaqulget Quaillun Pilartat (What the birds do): Yupik Eskimo understanding of geese and those who study them. *Arctic* **52**(1): 1-22.

Fitznor, Laara. 1998. The circle of life: affirming aboriginal philosophies in everyday Living, Chapter 2. Pp 21-40 in: Dawne McCance (ed*). Life Ethics in World Religions*. Altanta, GA: Scholars Press.

Foster, J., D. Harrison, and I.S. MacLaren. 1992. *Buffalo*. Edmonton, AB: University of Alberta Press.

Freeman, Milton. 1996. Polar bears and whales: contrasts in international wildlife regimes. Pp 175-180 in: Jill Oakes and Rick Riewe (eds). *Issues in the North*. Edmonton: Canadian Circumpolar Institute.

Freeman, Milton M.R. 1995. Economy, equity and ethics: current perspectives on wildlife management in the north. Pp 3-12 in: Jill Oakes (ed). *Human Ecology: Issues in the North Volume III*. Edmonton, Alberta: Canadian Circumpolar Institute and the Department of Human Ecology.

Freeman, Milton M.R. 1993. Traditional landusers as a legitimate source of environmental expertise. Pp. 153-161 in: Nancy Williams and Graham Baines (eds).*Traditional Ecological Knowledge - Wisdom for Sustainable Development.* Australian National University: Centre for Resource and Environmental Studies.

Freeman, Milton M.R. 1992. The nature and utility of traditional ecological knowledge. *Northern Perspectives* **20**(1): 912.

Freeman, Milton M.R. 1985. Appeal to tradition: different perspectives on arctic wildlife management. Pp. 265-281 in: Jenn Brøsted *et al.* (eds). *Native Power- The Quest for Autonomy and Nationhood of Indigenous Peoples.* Bergen, Norway: Universitesforlaget AS.

Freeman, Milton M. 1984. New/old approaches to renewable resources management in the north. *Northern Frontier Development – Alaska/Canada Perspectives.* 23rd Annual meeting, Western Regional Science Association, California.

Fumoleau, Rene, OMI. 1974. *As Long as this Land Shall Last: a history of Treaty 8 and Treaty 11, 1870-1939.* Toronto: McClelland and Stewart Ltd. 414 pp.

Gamble, Donald J. 1986. Crushing of cultures: western applied science in northern societies. *Arctic* **39**(1): 20-23.

Gambetta, Diego. 2000. Can we trust? Pp 213-237 in: Diego Gambetta (ed). *Trust: making and breaking cooperative relations*, electronic edition. Great Britain: Department of Sociology, University of Oxford. URL: http://www.sociology.ox.ac.uk/papers/gambetta213-237.doc.

Gates, C.C., B.T. Elkin, and D.C. Beaulieu. 1998. Initial results of an attempt to eradicate bovine tuberculosis and brucellosis from a wood bison herd in northern Canada. Pp 221-228 in: L. Irby and J. Knight (eds). *International Symposium on Bison Ecology and Management in North America.* Bozeman, Montana: Montana State University.

Gates, C.C., T. Chowns, and H. Reynolds. 1992. Wood Buffalo at the Crossroads. Pp 139-165 in: John Foster *et al.* (eds). *Buffalo.* Edmonton: University of Alberta Press.

Geist, Valerius. 1990. Northern diseased bison: a rebuttal of Agriculture Canada's arguments to eliminate bison from Wood Buffalo National Park. Pp 125-128 in: Federal Environmental Assessment Review Office. *Northern Diseased Bison Environmental Assessment Panel- Compendium of Supplementary Submissions.*

George, Peter. 1989. Native peoples and community economic development in Northern Ontario. *British Journal of Canadian Studies* **4**: 58-73.

Glaser, Barney G. 1978. *Theoretical Sensitivity: advances in the methodology of grounded G. theory.* Mill Valley, California: Sociology Press. 164 pp.

Good, David. 2000. Individuals, interpersonal relations, and trust. Pp 31-48 in: Diego Gambetta (ed). *Trust: making and breaking cooperative relations*, electronic edition. Great Britain: Department of Sociology, University of Oxford. URL: http://www.sociology.ox.ac.uk/papers/good31-48.doc.

Guyette, Susan. 1983. *Community - Based Research*. University of California, Los Angeles: American Indian Studies Center. 358 pp.

Hanyani-Mlambo, B.T. and Paul Hebinck. 1996. Formal and informal knowledge networks in conservation forestry in Zimbabwe. *Indigenous Knowledge and Development Monitor* **4**(3). URL: http://www.nuffic.nl/ciran/ikdm/4-3/contents.html.

Hart, Elisa. 1995. *Getting Started in Oral Traditions Research*. Occasional Paper No. 4. Yellowknife: Government of the Northwest Territories, Prince of Wales Northern Heritage Centre, Department of Education, Culture and Heritage. 96 pp.

Hawthorn, Geoffrey. 2000. Three ironies in trust. Pp 111-126 in: Diego Gambetta (ed). *Trust: making and breaking cooperative relations*, electronic edition. Great Britain: Department of Sociology, University of Oxford. URL: http://www.sociology.ox.ac.uk/papers/hawthorn111-126.doc.

Hoare, Tony, Chris Levy, and Michael Robinson. 1993. Participatory action research in native communities: cultural opportunities and legal implications. *Canadian Journal of Native Studies* **13**(1): 43-68.

Holling, C.S. 1998. Two cultures of ecology. *Conservation Ecology* (online) **2**(2): 4. URL: http://www.consecol.org/vol2/iss2/art4.

Holmes, Richard (ed). 1988. *Fundamentals of Sociology*. Toronto: Holt, Rinehart and Winston of Canada, Limited. 525 pp.

Honda-McNeil, Jamie. 2000. *Cooperative Management in Alberta: an applied approach to resource management and consultation with First Nations*. MSc thesis. Edmonton, Alberta: Department of Renewable Resources, University of Alberta. 216 pp.

Howard, A. and F. Widdowson. 1996. Traditional knowledge threats environmental assessment. *Policy Options*, November: 34-36.

Hudson, Robert J. and Bruce A. Burton. 1993. The Wildlife Industry. Pp 151-172 in: Jerome Martin, Robert J. Hudson, and Bruce A. Young. *Animal Production in Canada*. Edmonton; University of Alberta. 340 pp.

Hudson, Robert J. and V.V. Dezhkin. 1989. Socioeconomic prospects and design constraints. Pp 424-445 in: Robert J. Hudson, K.R. Drew, L.M. Baskin (eds). *Wildlife Production Systems: economic utilization of wild ungulates*. Great Britain: Cambridge University Press. 469 pp.

Hudson, R.J. and T. Tennessen. 1978. Observations on the behaviour and injuries of bison during capture and handling. *Animal Regulation Studies* **1**: 345-353.

Human Ethics Review Board. 1999. Ethical review of research or studies involving human subjects. Faculty of Agriculture, Forestry and Home Economics, University of Alberta. URL: http://www.afhe.ualberta.ca/Faculty_and_Staff/EthicsReview/instructions.asp.

Huntington, Henry P. and Maria E. and Fernández-Giménez. 1999. Indigenous knowledge in the Arctic: a review of research and applications. *Indigenous Knowledge and Development Monitor* **7**(3). URL: http://www.nuffic.nl/ciran/ikdm/7-3/index.html.

Husen, Torsten and T. Neville Postlthwaite. 1985. *The International Encyclopedia of Education Research and Studies*, Volumes 1, 2 & 7. Toronto: Pergamon Press. Pp 35-42, 645-650, 1729-1733, 3795-3800.

Intertribal Bison Cooperative. 2001. URL: http://www.intertribalbison.org/main.asp?id=1.

Johnson, Martha (ed). 1992a. *Lore - Capturing Traditional Environmental Knowledge*. Hay River, NT: Dene Cultural Institute and International Development Research Centre. 190 pp.

Johnson, Martha. 1992b. Dene traditional knowledge. *Northern Perspectives* **20**(1): 3-5.

Joly, D. and F. Messier. 2001. Limiting effects of bovine brucellosis and tuberculosis on wood bison within Wood Buffalo National Park. Submitted to Wood Buffalo National Park, Heritage Canada. Pp A6 15-16 in: Research Advisory Committee. *Final Report to the Minister of Canadian Heritage and the Constituencies of the Research Advisory Committee*. Unpublished report. Bison Research and Containment Program. Fort Smith, NT.

Kahn, Robert L. and Charles F. Cannell. 1957. *The Dynamics of Interviewing; theory, technique and cases*. New York: Wiley. 368 pp.

Kendrick, Anne. 2000. Learning conceptual diversity through caribou co-management.
Winnipeg, Manitoba: University of Manitoba. Unpublished draft, March 2000.

Kimmerer, Robin. 1998. Bringing the native perspective into natural resources education. *Winds of Change*, Summer 1998: 14-18.

Klein, David R. 1989. "Northern subsistence hunting economies." Pg 96-111 in: *Wildlife Production Systems-economic utilisation of wild ungulates*. Great Britain: Cambridge University Press.

Kofinas, Gary, Gail Osherenko, David Klein, and Bruce Forbes. 1999. Research planning in the face of change: a report on the human role in reindeer/caribou systems workshop held in Rovaniemi Finland, February, 1999. 45 pp.

Kowalsky, Laura, Wilfreda Thurston, Marja Verhoef, and Gayle Rutherford. 1996. Guidelines for entry into an Aboriginal Community. *Canadian Journal of Native Studies* **XVI**(2): 267-282.

Krogman, Naomi T. 1996. Frame disputes in environmental controversies: the case of wetland regulations in Louisiana. *Sociological Spectrum* **16**: 371-400.

Kroma, Siaka. 1995. Popularizing science education in developing countries through indigenous knowledge. *Indigenous Knowledge and Development Monitor* **3**(3). URL: http://www.nuffic.nl/ciran/ikdm/3-3/contents.html.

Kruse, Jack, Dave Klein, Steve Braund, Lisa Moorehead, and Bill Simeone. 1998. Co-management of natural resources: a comparison of two caribou management systems. *Human Organization* **57**(4): 447-458.

Kuhn, Thomas. 1970. *The Structure of Scientific Revolutions*. 2nd edition. Chicago: University of Chicago Press. 210 pp.

LaRose, Louis. 2001. Bison restoration developments among Inter Tribal Bison Cooperative members. Pp 234-238 in: B. D. Rutley (ed). *Bison are Back – 2000. Proceedings of the Second International Bison Conference*. August 2-4, 2000. Edmonton, AB.

Lewis, J. David and Andrew Weigert. 1985. Trust as a social reality. *Social Forces* **63**(4): 967-985.

Little Bear, Leroy. 1986. Aboriginal relationships to the land and resources. Pp 15-20 in: Jill Oakes, Rick Riewe, Kathi Kinew, and Elaine Maloney (eds). *Sacred Lands*. Occasional Publication No.43. Edmonton: University of Alberta, Canadian Circumpolar Institute.

Lincoln, Yvonna S. and Egon G. Guba. 1985. *Naturalistic Inquiry*. Beverly Hills, California: Sage Publications. 416 pp.

Luhmann, Niklas. 2000. Familiarity, confidence, trust: problems and alternatives Pp 94-107 in: Diego Gambetta (ed). *Trust: making and breaking cooperative relations*, electronic edition. Great Britain: Department of Sociology, University of Oxford.
URL: http://www.sociology.ox.ac.uk/papers/luhmann94-107.doc.

MacEwan, Grant. 1995. *Buffalo: Sacred and Sacrificed*. Edmonton, Alberta: Alberta Sport, Recreation, Parks and Wildlife Foundation. 208 pp.

Machlis, G.E. 1992. The contribution of sociology to biodiversity research and management. *Biological Conservation*. **62**: 161-170.

Malloch, Lesley. 1984. *Dene Government, past and future*. Yellowknife, NT: Western Constitutional Forum. 39 pp.

Mandeville, Violet. August 1998. *Fort Resolution, N.W.T.: a brief history.* Unpublished report for the community of Fort Resolution. 21 pp.

Marshall, Catherine and Gretchen B. Rossman. 1995. *Designing Qualitative Research.* 2nd Edition. Thousand Oaks, California: Sage Publications, Inc. 178 pp.

McCay, Bonnie J. 1998. Co-managing the commons. Pp 1-13 in: *International Community- Based Natural Resource Management Workshop.* Washington, D.C., USA, May 10-14 1998.

McCormack, Patricia A. 1996. Native homelands as cultural landscapes: decentering the wilderness paradigm. Pp 25-32 in: Jill Oakes, Rick Riewe, Kathi Kinew, and Elaine Maloney (eds). *Sacred Lands.* Edmonton: University of Alberta, Canadian Circumpolar Institute Occasional Publication No.43.

McCormack, Patricia A. 1992. The political economy of bison management in Wood Buffalo National Park. *Arctic* **45**(4): 367- 380.

Meagher, Mary and Margaret E. Meyer. 1994. On the origin of brucellosis in bison of Yellowstone National Park: a review. *Conservation Biology* **8**: 645-653.

Miles, Matthew B. and A. Michael Huberman. 1994. Chapter 10: Making good sense- drawing and verifying conclusions. Pp 245-287 in: *Qualitative Data Analysis: an expanded sourcebook.* 2nd edition. Sage Publications: Thousand Oaks, California.

Molm, Linda D., Nobuyuki Takahashi, and Gretchen Peterson. 2000. Risk and trust in social exchange: an experimental test of classical proposition. *American Journal of Sociology* **105**(5): 1396-1427.

Morgantini, Luigi E. 1990. Northern diseased bison: issues questions and concerns. A rebuttal of the proposed elimination of bison from WBNP. pp 261-271 in: Federal Environmental Assessment Review Office. *Northern Diseased Bison Environmental Assessment Panel- Compendium of Supplementary Submissions.*

Morrison, William R. 1985. *Showing the Flag: The Mounted Police and Canadian Sovereignty in the North, 1894-1925.* Vancouver: University of British Columbia Press. 220pp.

Morse, Janice M. 1999. Qualitative generalizability. *Qualitative Health Research* **9**(1): 5-7.

Morse, Janice M. 1994. Designing funded qualitative research. Chapter 13, Pp 220-234 in: Norman K. Denzin and Yvonna S. Lincoln (eds). *Handbook of Qualitative Research.* Thousand Oaks, California: Sage Publications, Inc. 643 pp.

Myers, Heather. 2001. Changing environment, changing times: environmental issues and political action in the Canadian North. *Environment* **43**(6): 33-44.

Natcher, David C. 2000. Constructing change: the evolution of land and resource Management in Alberta, Canada. *International Journal of Sustainable Development of World Ecology* **7**: 363-374.

Neuman, W. Lawrence. 1997. *Social Research Methods : qualitative and quantitative approaches*, 3rd ed. Toronto: Allyn & Bacon. 560 pp.

Neuman, W. Lawrence. 1991. Qualitative Research Design, Chapter 13. Pp 321-335 in: *Social Research Methods: Qualitative and Quantitative Approaches*. Boston: Allyn and Bacon.

Nishi, John S. 1998. *Hook Lake Wood Bison Recovery Project: Phase 2 Options*. Department of Resources, Wildlife, and Economic Development, Unpublished Report. Fort Smith, NT.

Nishi, John, Brett Elkin, Troy Ellsworth, Greg Wilson, Don Balsillie, and Janna van Kessel. 2000. An overview of the Hook Lake Wood Bison Recovery Project: where have we come from, where are we now, and where we would like to go? Pp 215-233 in: B.D. Rutley (ed). *Bison are Back – 2000. Proceedings of the Second International Bison Conference*. August 2-4, 2000, Edmonton, AB.

Nishi, J.S., B.T. Elkin, and T.R. Ellsworth. In press. The Hook Lake Wood Bison Recovery Project: Can a disease-free captive wood bison herd be recovered from a wild population infected with bovine tuberculosis and brucellosis? *Annual NY Academy of Science*. XX: XXX-XXX.

Northern Buffalo Management Board. 1992. *Northern Buffalo Management Program Report*. Unpublished report submitted to the Government of Canada. Fort Smith, NT. 131pp.

Northern Settlements: Settlements of the Northwest Territories (Book 2). 1966. Prepared for the Advisory Commission on the Development of Government in the Northwest Territories. Ottawa, Canada. 203 pp.

Northwest Territories Bureau of Statistics. *Fort Resolution Statistical Profile*. URL: http://siksik.learnnet.nt.ca/stats/Fort%20Resolution%20pro.html.

Notzke, Claudia. 1994. *Aboriginal Peoples and Natural Resources in Canada*. North York, ON: Captus Press Inc. 336 pp.

Notzke, Claudia. 1993. Aboriginal peoples and natural resources: co-management, the way of the future? *National Geographic Research and Exploration*. **9**(4): 395-397.

Ohmagari, Kayo and Fikret Berkes. 1997. Transmission of indigenous knowledge and bush skills among the Western James Bay Cree women of sub-arctic Canada. *Human Ecology* **25**(2): 197-222.

Oldfather, C.H. (trans.). 1946. Diodorus of Sicily. Pp in: *The Library of History*. Volume 3. Cambridge: Harvard University Press.

Osherenko, Gail. 1988a. *Sharing Power with Native Users: Co-management Regimes for Arctic Wildlife*. Working paper No. 5.Ottawa, ON: Canadian Arctic Resources Committee.

Osherenko, Gail. 1988b. Wildlife management in the North American Arctic: the case for co-management. Pp 92-104 in: Milton M.R. Freeman and Ludwig N. Carbyn (eds). *Traditional Knowledge and Renewable Resource Management in Northern Regions*. Edmonton: Occasional Publication No. 23.Boreal Institute for Northern Studies.

Osherenko, Gail. 1988c. Can co-management save Arctic wildlife? *Environment* **30**(6): 7-13, 28-33.

Outcrop Ltd., The Northern Publishers. 1985. *NWT Data Book 1984-85: A Complete Information Guide to the NWT and its Communities.* Northwest Territories: Outcrop Ltd.

Pinkerton, Evelyn W. 1993. Co-management efforts as social movements. *Alternatives* **19**(3): 33-38.

Poirier, Sylvie and Lorraine Brooke. 2000. Inuit perceptions of contaminants and environmental knowledge in Salluit, Nunavik. *Arctic Anthropology* **37**(2): 78-91.

Popper, Karl. 1974. *The Logic of Scientific Discovery*. 6th impression revision. London: Hutchinson. 479 pp.

Punch, Maurice. 1994. Chapter 5, Politics and ethics in qualitative research. Pp 83-97 in: Norman K. Denzin and Yvonna S. Lincoln (eds). *Handbook of Qualitative Research*. Thousand Oakes, California: Sage Publications.

Prystupa, Mark V. 1998. Barriers and strategies to the development of co-management regimes in New Zealand: the case of Te Waihora. *Human Organization* **57**(2): 134- 144.

Quinlan, Allyson E. 1999. *Prescribed fire and vegetation dynamics in northern boreal sedge-grass meadows of the Slave River Lowlands, Northwest Territories.* MSc thesis. Edmonton, Alberta: Department of Biological Sciences, University of Alberta. 109 pp.

Research Advisory Committee. 2001. *Final Report to the Minister of Canadian Heritage and the Constituencies of the Research Advisory Committee.* Unpublished report. Bison Research and Containment Program. Fort Smith, NT.

Reynolds, H.W. and A.W.L. Hawley. 1987. *Bison ecology in relation to agricultural development in the Slave River Lowlands, NWT*. Occasional paper No 63. Canadian Wildlife Service. 74 pp.

Reynolds, H.W. 1987. Description of the Slave River Lowlands. Pp 13-14 in: H.W. Reynolds and A.W.L. Hawley. *Bison ecology in relation to agricultural development in the Slave River Lowlands, NWT.* Occasional paper No 63. Canadian Wildlife Service.

Riewe, Rick and Lloyd Gamble. 1988. The Inuit and Wildlife Management Today. Pp 31-37 in: Milton M.R. Freeman and Ludwig N. Carbyn (eds). *Traditional Knowledge and Renewable Resource Management in Northern Regions.* Edmonton: Occasional Publication No. 23.Boreal Institute for Northern Studies.

Roberts, Karen. 1996. *Circumpolar Aboriginal People and Co-management Practice: current issues in co-management and environmental assessment.* Calgary, Alberta: Arctic Institute of North America and the Joint Secretariat, Inuvialuit Renewable Resources Committees. 172 pp.

Rothschild, Bruce M., Larry D. Martin, Galit Lev, Helen Bercovier, Gila Kahila Bar-Gal, Charles Greenblatt, Helen Donoghue, Mark Spigelman, and David Brittain. 2001. *Mycobacterium tuberculosis* complex DNA from an extinct bison dated 17, 000 years before the present. *Clinical Infectious Diseases* **33**: 305-311.

Rubin, Herbert J. and Irene S. Rubin. 1995. *Qualitative Interviewing- the art of hearing data.* Thousand Oaks, California: Sage Publications, Inc. 302 pp.

Sherry, Erin and Vuntut Gwichin First Nation. 1999. *The Land Still Speaks, Gwitchin words about life in Dempster country.* Whitehorse, Yukon: Aasman Design Inc. 322 pp.

Smith, David M. 1982. *Moose-Deer Island People: A History of the Native People of Fort Resolution.* Canadian Ethnology Service paper No. 81, National Museums of Canada: Ottawa.

Smith, David M. 1978. Fort Resolution, Northwest Territories. Pp 683-693 in: William Sturtevant (ed). *Handbook of North American Indians.* Washington: Smithsonian Institute.

Smith, David M. 1973. *Inkonze: Magico-Religious Beliefs of Contact- Traditional Chipewyan Trading at Fort Resolution, NWT, Canada.* National Museum of Man, National Museums of Canada: Ottawa. 23 pp.

Soper, J. Dewey. 1941. History, range, and homelife of the northern bison. *Ecological Monographs* **11**(4): 349-411.

Statistics Canada. 1999. 1996 Census of Canada. *Profile of Census Divisions and Subdivisions.* Ottawa: Industry Canada, 1999. Catalogue number 95-193-XPB.

Statistics Canada. 2001 Census of Canada. *Community profile of Fort Resolution, NT.* URL:http://www12.statcan.ca/english/profil01/Details/details1pop.cfm?SEARCH=BEGINS&PSGC=61&SGC=6106018&A=&LANG=E&Province=61&PlaceName=Fort%20Resolution&CSDNAME=Fort%20Resolution&CMA=&SEARCH=BEGINS&DataType=1&TypeNameE=Settlement&ID=13532.

Statistics Canada. 2002a. *Principal lakes, elevation and area, the provinces and territories*. URL: http://www.statcan.ca/english/Pgdb/Land/Geography/phys05.htm.

Statistics Canada. 2002b. *Principal rivers and their tributaries*. URL: http://www.statcan.ca/english/Pgdb/Land/Geography/phys06.htm.

Stevenson, Marc G. 1998. *Traditional knowledge in environmental management? from commodity to process*. SFM working paper. 1998-14. 15pp. URL: http://sfm-1.biology.ualberta.ca/english/pubs/PDF/WP_1998-14.pdf.

Stevenson, Marc G. 1997a. Inuit and co-management: principles, practices and challenges for the new millennium. Paper presented at the NAMMCO International Conference, *Sealing the Future*, St. John's, Newfoundland, November 25-27, 1997.

Stevenson, Marc G. 1997b. Ignorance and prejudice threaten environmental assessment. *Policy Options* March: 25-28.

Stevenson, Marc G. 1996. Indigenous knowledge in environmental assessment. *Arctic* **49**(3): 278-291.

Stevenson, Marc G. 1993. In search of Inuit ecological knowledge: its collection, interpretation and use- a discussion paper. Draft prepared for the Department of Resources, GNWT, Qikiqtaaluk Wildlife Board, and Parks Canada.

Strauss, Anselm and Juliet Corbin. 1990. *Basics of Qualitative Research : grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications. 270 pp.

Tessaro, Stacy V. 1992. Bovine tuberculosis and brucellosis in animals, including man. Pp 207-224 in: John Foster *et al.* (eds). *Buffalo*. Edmonton, Alberta: University of Alberta Press.

Tessaro, Stacy V. 1989. Review of diseases, parasite and miscellaneous pathological conditions of North American bison. *Canadian Veterinary Journal* **30**: 416-422.

Toma, J. Douglas. 2000. How getting close to your subjects makes qualitative data better. *Theory into Practice* **39**(3): 177-184.

Treseder, Leslie. 2000. *Forest co-management in northern Alberta: conflict, sustainability and power*. MSc thesis. Edmonton, Alberta: Department of Renewable Resources, University of Alberta. 159 pp.

Treseder, Leslie and Jamie Honda-McNeil. 1998. Chapter 1: The evolution and status of wildlife co-management in Canada. Pp 5-17 in: Leslie Treseder *et al. An overview of community-based wildlife management in Canada.* Prepared as a contribution to the "Evaluating Eden" Project. Edmonton, Alberta: University of Alberta.

Tyrrell, J.B. (ed.). 1934. *Journals of Samuel Hearne and Philip Turnor.* Toronto: The Champlain Society.

United Nations. 1992. Report of the United Nations conference on environment and development in: *Rio Declaration on Environment and Development.* Rio de Janeiro. URL: gopher://gopher.un.org:70/00/conf/english/riodecl.txt.

Usher, Peter J. 1987. Indigenous management systems and the conservation of wildlife in the Canadian North. *Alternatives* **14**(1): 3-9.

Usher, Peter J. 1986. *The Devolution of Wildlife Management and Prospects for Wildlife Conservation in the Northwest Territories.* Ottawa, ON: Canadian Arctic Resources Committee.

Usher, Peter J. 1976. Evaluating country food in the northern native economy. *Arctic* **29**: 105-119.

Usher, Peter J. 1971. *Fur Trade Posts of the Northwest Territories 1870-1970.* Northern Science Research Group, Department of Indian Affairs and Northern Development: Ottawa. 179 pp.

van Zyll de Jong, C.G., C. Gates, H. Reynolds, and W. Olson. 1995. Phenotypic variation in remnant populations of North American bison. *Journal of Mammalogy* **76**(2): 391-405.

Wein, Ross W. 1993. Circumpolar environmental issues in conservation areas-examples from Wood Buffalo National Park, Canada. Pp 85-96 in: Rick Riewe and Jill Oakes (eds). *Human ecology : issues in the North.* Volume II. Edmonton: Canadian Circumpolar Institute.

Williams, Bernard. 2000. Formal structures and social reality. Pp 3-13 in: Diego Gambetta (ed). *Trust: making and breaking cooperative relations*, electronic edition. Great Britain: Department of Sociology, University of Oxford. URL: http://www.sociology.ox.ac.uk/papers/williams3-13.doc.

Wilson, G.A. 2001. *Population genetic studies of wood and plains bison populations.* PhD thesis. Edmonton, Alberta: University of Alberta. 156pp.

Wilson, G.A. and C. Strobeck. 1999. Genetic variation within and relatedness among wood and plains bison populations. *Genome* **42**: 483-496.

Wobeser, Gary. 1992. Disease in northern bison: what to do? Pp 179-188 in: John Foster *et al.* (eds). *Buffalo.* Edmonton, Alberta: University of Alberta Press.

Wood Bison Recovery Team. 1990. *Implications of Diseased Bison Populations in Northern Canada for the Recovery of Wood Bison*. A submission by RENEW to the Northern Diseased Bison Assessment Panel. 37 pp.

Wortley, Debra, Naomi Krogman, and Debra Davidson. 2001. *The Difficulties with Devolution: community-based forest management planning in the Yukon under comprehensive land claims*. Final Project Report 2001-28 for the Sustainable Forest Management Network. Edmonton, AB: University of Alberta.

Personal Communication

Balsillie, Don, Band Chief of the Deninu Kue' First Nation. Fort Resolution, NT. Telephone correspondence, October 3, 1997.

Elkin, Dr. Brett. Wildlife Disease Specialist, GNWT. Yellowknife, NT. Email correspondence, April 2002.

Mandeville, Fred J. Wildlife Officer, RWED, GNWT. Fort Resolution, NT. Email correspondence, October 2001.

Nishi, John S. Bison Biologist. RWED, GNWT. Fort Smith, NT. Email correspondence, October and November 2001, April 2002.

Simon, Richard. Community Empowerment Office, DKFN. Liaison meetings, May 1999.

Unka, Tom. Former member of the Deninoo Wildlife and Resources Committee. Telephone correspondence, March 2002.

Appendix I:

Map of early Fort Resolution satellite communities

(Source: Smith, 1982, 79).

Appendix II:

Interview guide, information sheet for participants, consent form

CULTURAL, ECOLOGICAL, AND ECONOMIC IMPACTS OF THE HOOK LAKE WOOD BISON RECOVERY PROJECT.

INTERVIEW GUIDE

Please note: These questions will be asked by Janna van Kessel, and modified during the course of the research to obtain more comprehensive information from the respondents.

Mention that questions related to the Hook Lake Recovery Project animals refer to the bison that are at the facility here in town. Questions about the wild bison refer to the animals in the Hook Lake area.

Personal Information of Interviewee (questions will be asked only if the respondent appears at ease):

Record gender of interviewee:
1 = female
2 = male

What is your age?
1 = 19-29 years
2 = 30-39 years
3 = 40-49 years
4 = 50-59 years
5 = ≥ 60 years

Where were you born? (follow-up: Did you go to school there? Up to what grade level? Did you learn to live off of the land from your parents, grandparents, or other relatives?
(How long have you resided in Fort Resolution?)

Do you take part in any of the following activities? (yes or no)
( ) Education (Taking courses).
( ) Subsistence (i.e., hunting, fishing)
( ) Taking care of children.
( ) Part-time employment.
( ) Volunteer with community committees/councils.
Specify._____
( ) Other. Specify. _____

1. *Have you or anyone you know ever hunted bison? If yes, when and where? How do you decide what bison to shoot when you are hunting? (If not a hunter- Did you ever work with bison for meat preparation or crafts? If so, how?)*
   - What would you do with a diseased bison carcass? Are there typical actions taken with diseased carcasses?

2. *Do you think that the diseases tuberculosis and brucellosis are a problem in wood bison in the Hook Lake/Slave River Lowlands area?*
   -What have you heard about these diseases (tuberculosis and brucellosis) in

relation to the wood bison herd in the Hook Lake area?
-Have you or your friends/relatives seen evidence of these diseases in bison in the wild? What evidence have you/others seen?

3. *Why do you think these diseases have occurred in the wood bison?*

4. *What factors or information show the health of bison in the wild? (probe: environmental, spiritual, scientific). What indicates a bison sick with tuberculosis and brucellosis?*

   [**Contingency Question**: If the respondent sees tuberculosis or brucellosis as a problem, go on to this question- otherwise, continue on to question 9.]

5. *What do you think should be done to about the bison in the Hook Lake area?*
   - Should anything be done with the wild Hook Lake herd? If yes, what should be done (probe: immediate elimination, another round of capture and treatment, increase hunting in the area for the local people, sell big game hunts for community income and herd reduction).

6. *Do you believe these diseases will ever be completely eliminated in the wood bison?*

7. How do you think that infected bison will affect the community's economy? Traditional pursuits? Human health?

8. Have you seen any person infected with these diseases (tuberculosis or brucellosis)? If so, what was the treatment? What was the outcome of the infection?

<u>Hook Lake Wood Bison Recovery Project (shortened to Hook Lake Project) Questions:</u>

9. *Have you been involved (participated) with the Hook Lake Project? How so? For how long? Would you like to be more involved? If not, why? (If the person hasn't been involved with the project: What have you heard about the project?)*

10. The Hook Lake project is currently at the captive breeding stage where the managers of the project have animals antibiotics, are testing animals for disease, and may be selecting and separating animals for breeding purposes. Is this level of bison management appropriate? Why or why not?

11. *What do you think should be done with the Hook Lake project animals (the ones that are in captivity now)? (probe: released when and where, fence one of the prairies in the area for the disease-free herd, killed and sold, distributed to community?).*

12. *If the Hook Lake project disease-free animals are released, do you think they will have the ability to look after themselves? (i.e., will their behaviour change, relationship to predators, ability to forage?)*

13. Are there any indicators that would suggest that bison could thrive with the aid of this recovery project? If yes, what are the indicators?

14. Are there any indicators that would suggest bison could thrive without (outside) this recovery project? If so, what are the indicators?

15. Have there been any changes to practices involving bison that have occurred after the Hook Lake project was initiated in 1991(hunting, meat prep, etc)? If yes, what changes occurred?

16. *What are the advantages and disadvantages for the community that could result from the Hook Lake Project? (probe: economic, cultural, animal health, human health) Who is likely to benefit the most? Who is likely to benefit the least?*

17. *Would spin-off commercial activities that could result from the Hook Lake Project be acceptable to you? Why or why not? If acceptable, what activities would be good? (probe: big game hunts, tourism, sale of meat and hides, commercial production)*

Northern Diseased Wood Bison Issue:

18. *Do you know about the January 1990 public hearing in Fort Resolution at the Community Hall on the northern diseased wood bison issue?*

19. *Did you participate in the initial hearings? If yes, how did you participate? If not, what have you heard about the public hearings?*

20. After the public hearing, what concerns stand out in your mind about the northern diseased wood bison? What solutions were proposed? How did you feel about these solutions (probe: slaughtering animals to rid populations with disease, testing populations and building herds from disease-free animals, fencing off areas)?

21. Can you recall your thoughts regarding the opinions expressed by different groups, such as the biologists, wildlife conservation groups, Aboriginal groups, or representatives from Agriculture Canada, at the hearings?

22. *What is your opinion of the 1990 public hearing process?*

23. *Has your opinion/attitudes toward the northern diseased bison issue changed since January 1990? How so? What was caused your attitude/opinions to change? (probe: scientific information, experience, advice/knowledge from other community members).*

29. *Is the Hook Lake Project a good way of solving this disease issue? (probe: did it include an effective community consultation process?)*

30. Is there anyone else that you think we should talk to?

31. Is there anything else you would like to talk about?

CULTURAL, ECOLOGICAL, AND ECONOMIC IMPACTS OF THE HOOK LAKE WOOD BISON RECOVERY PROJECT.

INFORMATION SHEET FOR PARTICIPANTS

The purpose of this project is to learn about community members' perceptions of the Hook Lake Wood Bison Recovery Project. I am especially interested in how this project is related to the culture, economics and ecology of this area, and the potential of this project to contribute to the wellness of this community in the future. I will be interviewing a wide variety of community members to obtain as much information as possible. Each interview meeting will take approximately one hour to complete, although I may ask to follow up with a few questions at a later time. You have the right to refuse to answer any question or end this interview at any time. Please feel free to ask me to repeat or explain any question. Upon your request, I will send you a copy of my interview notes, and if you wish, add any further points or clarifications you make to the previous interview. I will be reading all of the interview notes to come up with common observations and concerns that appear in many of the interviews. Your identity will remain anonymous within any reports on this research. Community members' perceptions will be described in written reports, primarily for the community, my Masters thesis, the Territorial Farmers Association, and the Fort Smith Department of Resources, Wildlife, & Economic Development. I will also provide you with a summary of the results. After my project is completed I will be returning to Fort Resolution to present my results to the community and I will give a copy of my thesis and summary report to the community.

The objectives of this project are to:

- Find out if the Hook Lake Recovery Project agrees with the cultural views and knowledge of the local people and understand the relationship between local values, and science-based management.
- Examine wildlife co-management practices and their applicability to recovery project.
- Determine what community members think about the future of the recovery project.

If you have any questions, concerns, or recommendations about this project, please do not hesitate to contact any of the researchers. Thank you very much for your participation. We greatly appreciate your interest and co-operation in this research.

Researcher:
Janna van Kessel
Department of Renewable Resources
751 General Services Building, University of Alberta
Edmonton, AB Canada T6G 2H1
Ph# 780-492-8743
Fax# 780-492-4323

Fort Resolution location:
"the brown house"
(867) 394-4657

Supervisors:

Robert J. Hudson
Department of Agricultural, Food, and Nutritional Science
2-14 Agriculture-Forestry Building, University of Alberta
Edmonton, AB Canada T6G 2P5
Ph# 780-492-2908
Fax# 780-492-0097

Naomi T. Krogman
Department of Rural Economy
515 General Services Building, University of Alberta
Edmonton, AB Canada T6G 2H1
Ph# 780-492-4178
Fax# 780-492-0268

Community Contacts:

Don Balsillie
Chief, Deninu Kue' First Nation
Box 1899 Fort, Resolution, NT X0E 0M0
Ph# 867-394-4335
Fax# 867-394-5122

Lloyd Norn
Councilor, Deninoo Community Council
Fort Resolution, NT X0E 0M0
Ph# 867-394-4556 (leave message)

CULTURAL, ECOLOGICAL, AND ECONOMIC IMPACTS OF THE HOOK LAKE WOOD BISON RECOVERY PROJECT.

CONSENT FORM

Name of Interviewee: _____

Name of Interviewer: Janna van Kessel

Title of Research Project: *Cultural, ecological, and economic impacts of the Hook Lake Wood Bison Recovery Project.*

Place: Fort Resolution, NT

Date: _____

Researcher:
Janna van Kessel, Department of Renewable Resources, (780)492-8743

Supervisors:
Dr. Robert Hudson, Department of Agricultural, Food & Nutritional Science, (780)492-2908
Dr. Naomi Krogman, Department of Rural Economy, (780)492-4178

Records of the interviews will be used for the following purposes:

- Written report and presentation to the community of Fort Resolution.
- Masters of Science in Wildlife Ecology & Management thesis: *Cultural, ecological, and economic impacts of the Hook Lake Wood Bison Recovery Project.*
- Report to the Territorial Farmers Association and Department of Resources, Wildlife, & Economic Development.
- Presentations regarding M.Sc. degree (i.e., poster presentation at the Bison Symposium, August 2000 in Edmonton, AB).

I agree that the research procedures described on the Information Sheet and of which I have a copy have been explained to me, and that any questions that I have asked have been answered to my satisfaction. In addition, I know that I may contact any of the people identified on this form if I have further questions either now or in the future. The interviewer will not use records of the interviews for any other purposes other than this research project without the permission of the interviewee. I have been assured that personal records relating to this study will be kept confidential and that the results of this study may be published, but that my name will not be used. I understand that I am free to withdraw from the study at any time.

I agree to the use of information I have provided according to the conditions stated above.

_____ _____

(Signature of the Participant) Date

If participant is under the age of 18years:

_____

(Signature of Person Authorized to Sign on Behalf of the Subject, e.g. Parent)

_____

Date

I agree to use the information according to the terms outlined above.

_____

(Signature of Interviewer)

The people whom may be contacted about the research is:

Janna van Kessel
Department of Renewable Resources
751 General Services Building
University of Alberta
Edmonton, AB Canada T6G 2H1
Ph# 780-492-8743
Fax# 780-492-4323

Fort Resolution location:
"the brown house"
(867) 394-4657

Robert J. Hudson
Department of Agricultural, Food, and Nutritional Science
2-14 Agriculture-Forestry Building
University of Alberta
Edmonton, AB Canada T6G 2P5
Ph# 780-492-2908
Fax# 780-492-0097

Naomi T. Krogman
Department of Rural Economy
515 General Services Building
University of Alberta
Edmonton, AB Canada T6G 2H1
Ph# 780-492-4178
Fax# 780-492-0268

Lloyd Norn
Councilor, Deninoo Community Council
Fort Resolution X0E 0M0
867-394-4556 (leave message)